SCHOOL OF EDUCATION
LIBRARY
FEB 7 1950

The Journal of Experimental Education

A periodical report of scientific investigations relating to child development, curriculum, learning, teaching, supervision, measurements, statistics, and experimental techniques.

Volume XVIII | December, 1949 | Number 2

Satisfactions and Annoyances in Teaching:
Florence Kline 77

A Review and Interpretation of Investigations of Factors Related to Scholastic Success in Colleges of Arts and Science and Teachers Colleges:
Harley F. Garrett 91

The Construction of a Diagnostic Test of Listening Comprehension:
James I. Brown 139

Utilization of Census Data in Statistical Analysis of School Drop-Out Problems:
William L. Gragg 147

Is Concentrated Study Profitable?
Alice Turley and Hardeman Crowe 153

$5.00 a Year | Published Quarterly | $1.50 a Copy

Published by Dunbar Publications, Inc., 116 S. Carroll Street, Madison 3, Wisconsin.
Entered as second-class matter October 17, 1938 at the post office at Madison, Wisconsin under the act of March 3, 1879.

EDITORIAL BOARD

A. S. Barr, Chairman, Professor of Education, University of Wisconsin, Madison 6, Wis.

Arthur T. Jersild, Professor of Education, Teachers College, Columbia University, New York City. Editorially responsible for materials on child welfare, guidance, and development, published each December.

Palmer O. Johnson, Professor of Education, University of Minnesota, Minneapolis, Minnesota. Editorially responsible for materials on measurements, statistics, and methods of experimental research, published each March.

H. H. Remmers, Professor of Educational Psychology, Director Division Educational Reference, Purdue University, Lafayette, Indiana. Editorially responsible for materials on learning, teaching and supervision, published each September.

J. Wayne Wrightstone, Director, Bureau of Educational Research, Board of Education of the City of New York, Brooklyn, New York, 110 Livingston Street, Brooklyn, New York. Editorially responsible for materials on curriculum construction, published each June.

CONTRIBUTING EDITORS

Emmett A. Betts, Research Professor and Director of Reading Clinic, Pennsylvania State College, State College, Pennsylvania.

Gilbert L. Betts, Supervisor of Graduate Research in Education, Colorado State College, Fort Collins, Colorado.

Leo J. Brueckner, Professor of Education, University of Minnesota, Minneapolis, Minnesota.

Oscar K. Buros, Associate Professor of Education, Rutgers University, New Brunswick, New Jersey.

Guy T. Buswell, Professor of Educational Psychology, University of Chicago, Chicago, Illinois.

Harold D. Carter, Associate Professor of Education, University of California, Berkeley 4, California.

Leslie L. Chisholm, Associate Professor of Education, State College of Washington, Pullman, Washington.

Herbert S. Conrad, Technical Consultant, College Entrance Examination Board, Princeton, New Jersey.

Stephen M. Corey, Professor of Educational Psychology, University of Chicago, Chicago, Illinois.

Edward E. Cureton, 853 East Brewster Road, Alcoa, Tennessee.

Robert A. Davis, Professor of Education, Director of Bureau of Educational Research, University of Colorado, Boulder, Colorado.

Harl R. Douglass, Director of College of Education, University of Colorado, Boulder, Colorado.

Harold A. Edgerton, Director, Occupational Opportunities Service, Professor of Psychology, Ohio State University, Columbus 10, Ohio.

John C. Flanagan, Professor of Psychology, University of Pittsburgh, Pittsburgh, Pennsylvania.

Carter V. Good, Dean, Teachers College, University of Cincinnati, Cincinnati 21, Ohio.

Robert W. B. Jackson, Assistant Professor of Educational Research; Assistant Director, Department of Educational Research, Ontario College of Education, University of Toronto, Toronto, Canada.

Harold E. Jones, Professor of Psychology and Director, Institute of Child Welfare, University of California, Berkeley 4, California.

Noel Keys, Professor of Education and Lecturer in Human Relations, University of California, Berkeley, California.

D. Welty Lefever, Professor of Education, University of Southern California, Los Angeles, California.

Edward A. Lincoln, Consulting Psychologist, Halifax, Massachusetts.

Irving Lorge, Professor of Education, Executive Officer, Institute of Psychological Research, Teachers College, Columbia University, New York 27, New York.

A. R. Mead, Director of Educational Research, University of Florida, 330 P. K. Yonge Building, Gainesville, Florida.

T. E. Newland, Lt. Comdr., USNR, 2702 Wisconsin Avenue, N. W., Washington 7, D. C.

C. W. Odell, Professor of Education, University of Illinois, Urbana, Illinois.

Willard C. Olson, Professor of Education, Director of Research in Child Development, University of Michigan, Ann Arbor, Michigan.

W. E. Peik, Dean and Professor of Education, University of Minnesota, Minneapolis, Minnesota.

Walworth R. Plumb, Director Student Personnel Service, University of Minnesota (Branch), Duluth, Minnesota.

S. L. Pressey, Professor of Educational Psychology, Ohio State University, Columbus, Ohio.

Clarence E. Ragsdale, Professor of Education, University of Wisconsin, Madison, Wisconsin.

William Reitz, Associate Professor of Education, College of Education Examiner, Wayne University, Detroit 1, Michigan.

Henry D. Rinsland, Professor of Education and Director of Educational Research, The University of Oklahoma, Norman, Oklahoma.

Robert T. Rock, Jr., Professor of Psychology, Head of Dept. of Psychology, Graduate School, Fordham University, New York City.

Phillip J. Rulon, Professor of Education, Harvard Graduate School of Education, Cambridge 38, Mass.

Douglas E. Scates, Professor of Education, Duke University, Durham, North Carolina.

Harold Seashore, Director, Test Division, The Psychological Corporation, New York 18, New York.

David Segel, Educational Consultant, Specialist in Tests and Measurements, Federal Security Agency, U. S. Office of Education, Washington, D. C.

Paul W. Terry, Professor of Educational Psychology, University of Alabama, University, Alabama.

Helen Thompson, Associate Attending Psychologist, New York Post-Graduate Hospital, 303 East 20th Street, New York 3, New York.

Robert L. Thorndike, Associate Professor of Education, Teachers College, Columbia University, New York City.

Herbert A. Toops, Professor of Psychology, Ohio State University, Columbus, Ohio.

Maurice E. Troyer, Director, Bureau of School Services, Syracuse University, Syracuse 10, New York.

Helen M. Walker, Professor of Education, Teachers College, Columbia University, New York City.

Beth L. Wellman, Professor of Psychology, Child Welfare Research Station, State University of Iowa, Iowa City, Iowa.

Guy M. Wilson, Emeritus Professor of Education Boston University, 33 Pine Street, Wellesley Hills, Mass.

Paul A. Witty, Professor of Education, Director of Psycho-Educational Clinic, School of Education, Northwestern University, Evanston, Illinois.

Ernest R. Wood, Professor of Education, New York University, New York City.

D. A. Worcester, Chairman Department of Educational Psychology and Measurement, University of Nebraska, Lincoln, Nebraska.

LITHO PRODUCTIONS

MADISON WIS

Journal of Experimental Education

Volume XVIII December, 1949 Number 2

SATISFACTIONS AND ANNOYANCES IN TEACHING

FRANCES FLORENCE KLINE*
Student Counseling Center
University of Wisconsin

This study was undertaken to find out (1) what seemed to be possible sources of annoyances and satisfactions in teaching from the standpoint of what teachers want and what they thought was expected of them, and (2) if these items, which appeared to be possible sources of annoyance and satisfaction in teaching, had more meaning when they were felt to affect teachers variously.

One hundred teachers, enrolled in the School of Education of the University of Wisconsin during the summer session of 1946, were asked to complete a somewhat detailed checklist of items (see Appendix A**) which considered activities and conditions relating to four categories, namely, (1) the child, (2) the curriculum, (3) the teacher-personnel relationships, and (4) the physical plant. A detailed account of what seemed to be possible sources of satisfaction and annoyances in teaching will be found in Part IV, and a detailed summary of the factors seeming to make these possible sources of satisfaction and annoyance in teaching meaningful will be found in Part V of the Appendix.

Since the first concern of this study was with finding out what appeared to be the possible sources of annoyance or satisfaction in teaching from the standpoint of what teachers wanted and what teachers thought was expected of them, the author "paired" the statements, that is, combined a want with an expectancy having similar meaning. There were in this checklist a total of 220 items; of this number 215 were used, and five were eliminated as duplications. Of the 215 items used, 198 could be paired for similarity of meaning. Sixty-one of 99 paired statements were possible sources of annoyance and seven were possible sources of satisfaction, both from the standpoint of what teachers wanted and what they thought was expected of them.

Almost one-third of the 61 paired items which were possible sources of annoyance arose out of the category referring to the child. In this category, which was composed of 49 items, some aspect or aspects of the following twenty paired items appeared to be possible sources of annoyance:

1. Know all the pertinent facts about each child.
2. Acquire objective data about each child.
3. Know the interests of each child.
4. Know the limitations of each child.
5. Provide for individual differences.
6. Help each child individually.
7. Have more time in which to help each child individually.
8. Use the cumulative record files for information about each child.
9. Stay after school to assist in remedial activities.
10. Make out case study reports on the poorest students.
11. Have clerical help obtain the pertinent facts about each child.
12. Have to teach large classes (30 or more students).
13. Consider learning a cooperative experience.
14. Call upon students to assist in planning the learning experience.
15. Give awards to students for successful work.
16. Have students discipline themselves.
17. Give standardized tests to students.
18. Group students homogeneously.
19. Group students heterogeneously.
20. Grade students according to the normal probability curve.

The one item which was a possible source of

*The author wishes to acknowledge the assistance of her major professor, Dr. A. S. Barr, in planning and carrying forward the research here reported.

**See original thesis on file, Library, University of Wisconsin, Madison, Wisconsin.

satisfaction from the standpoint of what teachers wanted and what they thought was expected of them was to be impartial to their students.

In the second category which was composed of 78 items referring to the curriculum, there were 17 paired statements, 14 of which were possible sources of annoyance and three were possible sources of satisfaction. The paired statements which seemed to be possible sources of annoyance were:

1. Follow the philosophy of the school in planning school work.
2. Exclude all memorization from the learning experience.
3. Plan work around a required course of study.
4. Teach what was in the textbook.
5. Use community resources to make the learning experience meaningful.
6. Buy and pay for refreshments for school parties out of teacher's own money.
7. Direct noon lunch hour activities.
8. Supervise two or more study halls.
9. Make several different preparations daily.
10. Type their own reports.
11. Use the most recent textbooks in their fields.
12. Supervise more than two extra-curricular activities.
13. Supervise one extra-curricular activity.
14. Acquire reliable information about community needs.

Some aspect or aspects of the three items which were possible sources of satisfaction were: (1) vary teaching techniques, (2) teach controversial issues, and (3) make the learning experience meaningful.

The third category, which was composed of 72 items, related to teacher-personnel relationships. Almost one-third of the 61 paired items which were possible sources of annoyance came from this category. These items were:

1. Regard administrators as high caliber professional men.
2. "Play up" to administrators for special privileges.
3. Assist the administration in the determination of educational policies to be set up.
4. Suggest needed reforms in the teaching arrangements and methods in the school.
5. Have frequent opportunities to express themselves at staff meetings.
6. Assist in planning teachers' meetings.
7. Yield to expediency in school affairs.
8. Hold their own welfare above that of others.
9. Have principals offer advice toward personal improvement by way of the private conference.
10. Secure public recognition for work well done.
11. Submit lesson plans to administrative superiors.
12. Be informed of changes in the daily class schedule.
13. Have supervision.
14. Refer all disciplinary matters to administrative officers.
15. Have other teachers feel free to use each student's time.
16. Coordinate their work with that of other departments of the school.
17. Invite the board of education to visit their classes.
18. Enjoy special privileges because of seniority.
19. Orient himself in a new school system.
20. Consider principals impartial in the handling of their problems.

The three paired items which seemed to be considered possible sources of satisfaction were: (1) attend the social affairs of faculty members, (2) help inexperienced teachers, (3) commend the successful teaching of the other teachers.

In the fourth category, which was composed of 15 items, some aspect or aspects of the seven paired statements were possible sources of annoyance, referring to the physical plant. These were:

1. Have clean blackboards.
2. Have satisfactory janitorial service without having to ask for it.
3. Dust their classrooms.
4. Teach in a large classroom.
5. Teach in but one regularly assigned classroom.
6. Have room temperatures constant in their classroom.
7. Have adequately lighted classrooms.

In the above list, only those items were considered possible sources of annoyance or satisfaction which differentiated significantly at the one percent confidence level.

If we change the level of significance to one out of every five, then there were 38 items which were possible sources of annoyance. In the category referring to the child, some aspect or aspects of the following nine items were possible causes for annoyance: teachers appeared to be annoyed with wanting and being expected to (1) teach large classes, and (2) provide their own clerical help to obtain the pertinent facts about each child. They were annoyed with some aspect or aspects of wanting (1) more time to help each child individually, (2) to teach classes grouped homogeneously according to IQ ratings, (3) to teach classes grouped heterogeneously according to IQ ratings, (4) to use the cumulative record files to gather information about each student, and (5) to make out the case study reports on the poorest students.

There were eleven items in the category referring to the curriculum which were possible sources of annoyance to one out of every five re-

spondents. Teachers were annoyed with some aspect or aspects of wanting and being expected to (1) make several different preparations daily, and (2) direct noon lunch-hour activities. In addition, they were annoyed with some aspect or aspects of wanting (1) to use instructional material not available in their schools, (2) the library to have materials for their classes, (3) to supervise more than two extra-curricular activities, (4) more time in which to plan their work, (5) clerical help for routine tasks, (6) to type their own reports, and (7) to provide their own clerical help for routine tasks.

There were nine items from the category referring to teacher-personnel relationships which were annoying to at least one out of every five respondents. Some aspect or aspects of wanting and being expected to (1) "play up" to the administration for special privileges, and (2) suggest the reforms in the teaching arrangements and methods in the school were annoying to a number of respondents. Teachers were annoyed with some aspect or aspects of being expected to assist the administration to formulate the educational policies of the school. At least one out of every five of the respondents was annoyed with some aspect or aspects of wanting (1) their principals to understand their problems, (2) supervision, (3) to feel free to use each student's time as they saw fit, (4) other teachers to feel free to call students from their classes whenever they desired their services, and (5) to enjoy special privileges because of seniority.

There were two items from the category referring to the physical plant which were annoying to at least one out of every five respondents. Teachers were annoyed with being expected to teach in a classroom not suited to the instructional needs of their classes. They also wanted to teach in attractive classrooms.

In considering the percentages of items which were possible sources of annoyance or satisfaction for each category, insteach of the total list of items, then it may be noted that the largest percentage of items which were possible sources of annoyance arose out of the category which referred to the child, and all but one of the items in the category which referred to the physical plant were possible sources of annoyance. The next category which had a high percentage of possible sources of annoyance was that referring to teacher-personnel relations, with the smallest percentage of possible sources of annoyance from any one category coming from the area referring to the curriculum. The largest percentage of items which were considered possible sources of satisfaction came from the category referring to the curriculum, with the next highest percentage of possible sources of satisfaction coming from the area of teacher-personnel relationships. There were several possible sources of satisfaction from the category referring to the child and but one from the physical plant area.

Seventy-eight percent of the total number of items in the checklist were possible sources of annoyance. The category which had the highest percentage of possible sources of annoyance was that referring to teacher-personnel relationships. Twenty-five percent of the total percentage of possible sources of annoyance came from the curriculum with the category referring to the child being next in importance for the number of possible sources of annoyance. Finally, the smallest percentage of items came from the physical plant area. As was previously stated, 22% of the total number of items in this checklist were possible sources of satisfaction. Half of these possible sources of satisfaction arose out of the category referring to the curriculum with the category dealing with teacher-personnel relationships being next in importance for the number of possible sources of satisfaction. Three percent of the total number of items in the checklist which were considered possible sources of satisfaction came from the category referring to the child and since there was but one item in the category referring to the physical plant, that area provided the smallest percentage of the possible sources of satisfaction.

It seems, in summarizing the data in yet another way, that possible sources of annoyance arose more out of what teachers wanted than out of what teachers thought was expected of them. Of the 112 items which referred to what teachers wanted, 99 seemed to be possible sources of annoyance; of the 103 items which referred to what teachers thought was expected of them, 69 seemed to be possible sources of annoyance. The possible sources of satisfaction arose more out of what teachers thought was expected of them than from what they wanted, for 13 items were possible sources of satisfaction from the standpoint of what teachers wanted and 34 items were possible sources of satisfaction from the standpoint of what teachers thought was expected of them.

When these responses were considered in terms of the several background factors of sex, marital status, educational background, type of position, military status, type of teacher training institution, size of teaching community, size of home community, and length of teaching experience for all the items in the checklist which were felt to be possible sources of annoyance, it was found, with the frequencies expressed in parentheses, that the men seemed to be annoyed with more items (127) than the women (24); the married respondents seemed annoyed with more items (118) than the single respondents (22); those with less than the M.A. degree seemed annoyed with more items (104) than those with less than the Ph.D. degree (32). High school teachers seemed annoyed with more items (116) than were administrators (12). Those without military status seemed annoyed with more items (83) than did those with military status (56). The

graduates of teachers colleges seemed annoyed with many more items than were graduates from private colleges (16) and universities (10). Those with teaching experience in communities of less than 2,500 seemed annoyed with a greater number of items (45) than were those with teaching experience in communities of over 150,000 (6); those from communities of less than 2,500 seemed annoyed with more items (83) than were those from communities of over 150,000 (6), while those from communities of 2,500 to 39,000 found none of the items annoying to them. Those with over ten years of teaching experience seemed annoyed with more items (24) than those with five to ten years of teaching experience (18), those with two to five years of teaching experience (6), or those with less than two years of teaching experience (1).

There seemed to be some reason to believe that there would be an advantage in summarizing the data concerning the items which were possible sources of annoyance, both from the standpoint of what teachers wanted and what they thought was expected of them. In this respect, it may be said that answers differed by sex, for the men felt that many more items were possible sources of annoyance than did the women. One's marital status seemed to have affected one's answers, for the married respondents felt that many more items were possible sources of annoyance than did the single respondents. The amount of education the respondent had seemed to have affect on the responses: the less the education, the greater the number of items which were considered possible sources of annoyance; the type of position held by the respondent seemed to have affected the responses: high school teachers seemed to have considered many more items possible sources of annoyance than did administrators. There also seemed to be some difference in the number of items which were considered possible sources of annoyance on the basis of military status, for those without military status felt that more items could be so considered than did those with military status. The type of teacher training institution attended by the respondents seemed to indicate that those graduated from teacher colleges felt that many more items were possible sources of annoyance than did those graduated from universities and private colleges. The size of community in which the respondents taught seemed to have some affect on the number of items which could be considered possible sources of annoyance, for those teaching in communities of less than 2,500 felt that many more items could be so classified than did those teaching in communities of other sizes. Those from communities of less than 2,500 felt that many more items seemed to be possible sources of annoyance than did those from communities of other sizes, in fact those from communities of 2,500 to 39,000 felt that none of the items were annoyances. Finally, the more experience the teacher had, the greater the number of items which were felt to be possible sources of annoyance.

There seemed to be but little reason to believe, in summarizing the data concerning the items which were possible sources of satisfaction from the standpoint of what teachers wanted and what they thought was expected of them, that the number of items which were felt to be possible sources of satisfaction according to this sample were due even in part to differences arising out of the several background factors. When the responses which were considered possible sources of satisfaction in terms of sex, marital status, type of educational background, military status, type of teacher training institution, size of teaching community, and length of teaching experience, were considered, there were no differences. There was, however, some difference for type of position held and for the size of the home community: high school teachers and those from communities of less than 2,500 felt that there were less items which could be considered possible sources of satisfaction than did administrators and those from communities of other sizes.

It was the author's thought that the possible sources of satisfaction or annoyance in teaching might have more meaning if they were considered (1) to affect the total teaching population, (2) to affect the individuals personally, (3) to affect the individuals frequently, (4) to affect the individuals intensely, or (5) to be provocative of positive responses.

In an analysis of the possible sources of annoyance and satisfaction in teaching, considered in terms of the first question, "In general, does this want/expectancy apply to teachers as you know them?" it was found that:

1. Three-fourths or the one hundred twenty-two of the total number of possible sources of annoyance were felt to affect the total teaching population.
2. Of the number of items which were felt to affect the total teaching population, not as many of the items (43%) which were possible sources of annoyance from the standpoint of what teachers thought was expected of them were felt to affect all teachers as did (52%) from the standpoint of what teachers thought was expected of them.
3. Of the total number of items in each category which were considered possible sources of annoyance, it was found that 88% of the items referring to the child, 70% of the items referring to teacher-personnel relationships, 69% of the items referring to the curriculum, and 53% of the items referring to the physical plant, were felt to affect all teachers.
4. Over half (59%) of the total number of items which were considered possible

sources of annoyance from the standpoint of what teachers wanted and almost all (93%) of the total number of items which were considered possible sources of annoyance from the standpoint of what teachers thought was expected of them were felt to affect the total teaching population.

5. When those responses were considered in terms of the several background factors of sex, marital status, educational background, type of position, military status, type of teacher training institution, size of teaching community, size of home community, and length of teaching experience for all the items in the checklist which were felt to affect the total teaching population, it was found with the frequencies expressed in parentheses, that (a) the men seemed to feel that more items (108) affected all teachers than did women (71), (b) the married respondents seemed to feel that more items (109) affected all teachers than did the single respondents (76), (c) those with less than the M.A. degree seemed to feel that more items (105) affected all teachers than did those with less than the Ph.D. degree (76), (d) high school teachers seemed to feel that more items (91) affected all teachers than did administrators (49), (e) those without military status seemed to feel that more items (105) affected all teachers than those with military status (85), (f) the graduates from teachers colleges seemed to feel that more items (99) affected all teachers than did those graduated from universities or private colleges (63), (g) those with teaching experience in communities of less than 2,500 seemed to feel that more items (80) affected all teachers than did those with teaching experience in communities of 10,000 to 39,000 (39), 39,000 to 150,000 (38), 2,500 to 10,000 (23), and 39,000 to over 150,000 (11), (h) those from communities of less than 2,500 seemed to feel that more items (94) affected all teachers than did those from communities of 10,000 to 39,000 (53), 2,500 to 10,000 (26), and over 150,000 (28), (i) those with over ten years of teaching experience seemed to feel that more items (83) affected all teachers than did those with from five to ten years of teaching experience (66), two to five years of teaching experience (35), less than one year of teaching experience (24), and those with one to two years of teaching experience (21).

The women, the single respondents, those with less than the Ph.D. degree, the administrators, those with and without military status, those from every type of teacher training institution, those with teaching experience in communities of every size, those from communities of every size, and those who had less than one year of teaching experience to over ten years of teaching experience seemed to feel that more items affected the total teaching population than they themselves found annoying despite the fact that but 122 of the 168 items which were considered possible sources of annoyance were felt to affect the total teaching population.

The men, the married respondents, those with less than the M.A. degree, and high school teachers felt that fewer items were felt to affect all teachers than they themselves considered annoying.

In summarizing the data according to the differences in the several background factors, it may be said that (1) answers differed by sex, since the men felt that more items affected the total teaching population than did the women; (2) one's marital status seemed to have affected one's views, for married respondents felt that more items affected the total teaching population than did single respondents; (3) the amount of education a respondent had seemed to have affected his responses: the greater the amount of education the less the amount of responses felt to affect the total teaching population; (4) the type of position seemed to have affected the responses: high school teachers felt more items affected the total teaching population than did administrators; (5) the possession of military status seemed to affect the responses: those with military status felt that less items affected the total teaching population than did those without that status; (6) the type of teacher training institution attended by the respondents seemed to have affected the responses, for the graduates from teachers colleges felt that more items affected all teachers than did those graduated from other types of teacher training institutions; (7) the size of community in which a teacher taught seemed to have affected his responses: (a) those from communities of less than 2,500 felt that many more items affected the total teaching population than did those from any other size of teaching community, and (b) those from communities of 39,000 to over 150,000 felt that but a small fraction of the items affected all teachers; (6) the size of home community from which the respondents came seemed to have affected the responses, for those from communities of less than 2,500 felt that many more items affected all teachers than did those from communities of other sizes, and only a small fraction of those items were felt to affect all teachers according to those from communities of 2,500 to 10,000; and (9) the amount of teaching experience a person had seems to have affected the responses, for the greater the amount of experience the greater the number of items which were felt to affect the total teaching population.

In an analysis of the possible sources of satisfaction in teaching for this same question, it was found that:

1. Slightly more than half (25 or 53%) of the 47 items which were considered possible sources of satisfaction were felt to affect the total population.
2. Over two-thirds or 62% of the items which were felt to affect the total teaching population appeared to be possible sources of satisfaction from the standpoint of what teachers thought was expected of them and about one-third of the items (32%) which were considered possible sources of satisfaction from the standpoint of what teachers wanted seemed to affect the total teaching population.
3. Of the total number of items in each category which were considered possible sources of satisfaction were felt to affect all teachers: (a) 81% of the items referring to the curriculum, (b) 50% of the items referring to the child, and (c) 39% of the items referring to teacher-personnel relationships.
4. Almost two-thirds (61%) of the total number of items which were considered possible sources of satisfaction from the standpoint of what teachers wanted were felt to affect the total teaching population. Almost three-fourths (74%) of the total number of items which were considered possible sources of satisfaction from the standpoint of what teachers thought was expedted of them were felt to affect the total teaching population.
5. When these responses were considered in terms of the several background factors, it seemed that (a) the men felt that more items (21) affected all teachers than did the women (12); (b) the married respondents felt that more items (21) affected all teachers than did the single respondents (11); (c) those with less than the M.A. degree felt that more items (17) affected all teachers than did those with less than the Ph.D. degree (14); (d) the high school teachers felt that more items (12) affected all teachers than did administrators (6); (e) those without military status felt that more items (19) affected all teachers than did those with military status (13); (f) those graduated from teachers colleges felt that more items (15) affected all teachers than did those graduated from universities (12) or private colleges (6); (g) those with teaching experience in communities of less than 2,500 felt that more items (71) affected all teachers than did those from communities of 2,500 to 10,000 (6), and 39,000 to 150,000 (6), and those in teaching communities of 10,000 to 39,000 (5); (h) those from communities of less than 2,500 felt that more items (15) affected all teachers than did those from communities of 10,000 to 39,000 (7), 2,500 to 10,000 (3), and those from communities of over 150,000 (2); (i) those with over ten years of teaching experience felt that more items (17) affected all teachers than did those with from five to ten years of teaching experience (9), those with two to five years of teaching experience (6), those with one to two years of teaching experience (3), and those with less than one year of teaching experience (2).

In an analysis of the possible sources of annoyance and satisfaction in teaching considered in terms of the question, "Does this want/expectancy affect you?" one found that:

1. Ninety-nine percent of 167 items which were possible sources of annoyance were felt to affect the respondents personally.
2. Fifty-nine percent of the items which were felt to affect the respondents personally were considered possible sources of annoyance from the standpoint of what teachers wanted, and 41% of the items which were considered possible sources of annoyance from the standpoint of what the teachers thought was expected of them were felt to affect the respondents personally.
3. All of the items which referred to the child, to teacher-personnel relationships, to the physical plant, and all but one of the items which referred to the curriculum, were felt to affect the respondents personally.
4. Ninety-eight percent of the total number of items which were considered possible sources of annoyance from the standpoint of what teachers wanted and all of the items which were considered possible sources of annoyance from the standpoint of what teachers thought was expected of them were felt to affect the respondents personally.
5. When these responses were considered in terms of the several background factors, it seemed, with the frequencies expressed in parentheses, that (a) the men felt that more items (160) affected them personally than did the women (93); (b) the married respondents felt more items (154) affected them personally than did the single respondents (101); (c) those with less than the Ph.D. degree felt that more items (128) affected them personally than did those with less than the M.A. degree (121); (d) high school teachers felt that more items (108) affected them personally than did the administrators (63); (e) those without military status felt that more items (128) affected them personally than did those with military status (112); (f) those graduated from teachers colleges felt that more items (128) affected them personally than did those graduated from universities (92) and private colleges (66); (g) those with teaching exper-

ience in communities of less than 2,500 felt that more items (104) affected them personally than did those with teaching experience in communities of 39,000 to 150,000 (47), 2,500 to 150,000 (47), 10,000 to 39,000 (37), 2,500 to 10,000 (27); and those from communities of over 150,000 (12). (h) Those from communities of less 2,500 felt that more items (128) affected them personally than did those from 10,000 to 39,000 (53), 2,500 to 10,000 (28), and over 150,000 (15). (i) Those with teaching experience of over ten years felt that more items (97) affected them personally than did those with five to ten years of teaching experience (48), those with one to two years of teaching experience (28), and those with less than one year of teaching experience (24).

It may be observed from these frequencies that:

1. There were in all cases more items which were felt to affect the respondents personally than were felt to affect the total teaching population with these three exceptions: those with teaching experience in communities of 10,000 to 39,000, those from communities of over 150,000, and those with one to two years of teaching experience.
2. There seemed to be some reason to believe that the number of items which affected the respondents personally were due in part to differences appearing in the several background factors. In brief, the same conclusions could be drawn for differences arising in each of these background factors for these possible sources of annoyance as were felt to affect the total teaching population with the above mentioned exceptions: (a) those with teaching experience in communities of over 150,000 felt that less items affected them personally than did those from communities of other sizes, (b) those from communities of over 150,000 felt that less items affected them personally than did those from communities of other sizes, and (c) the greater the amount of education the greater the number of items which were felt to affect the respondents personally.

In an analysis of the possible sources of satisfaction in teaching, considered in terms of whether they were felt to affect the respondents personally, one found that

1. Forty-five or 96% of the 47 items which were considered possible sources of satisfaction, both from the standpoint of what teachers wanted and what they thought was expected of them, were felt to affect them personally.
2. Of this number which were felt to affect the respondents personally, almost three-fourths (71%) of the items which were possible sources of satisfaction from the standpoint of what teachers thought was expected of them and over one-fourth (29%) of the items which were possible sources of satisfaction from the standpoint of what teachers wanted, were felt to affect the respondents personally.
3. Of the total number of items in each category which were considered possible sources of satisfaction from the standpoint of what they wanted and what they thought was expected of them, it was found that all of the items referring to the child and the physical plant, 94% of the items referring to teacher-personnel relstionships, and 96% of the items referring to the curriculum affected the respondents personally.
4. All of the items which were considered possible sources of satisfaction from the standpoint of what teachers wanted affected the respondents personally; 94% of the total number of items which were considered possible sources of satisfaction from the standpoint of what teachers thought was expected of them were felt to affect the respondents personally.
5. When these responses were considered in terms of the several background factors, it was found that (a) the men felt that more items (39) affected them personnally than did the women (15); (b) the married respondents felt that more items (36) affected them personally than did the single respondents (19); (c) those with less than the M.A. degree felt that more items (25) affected them personally than did those with less than the Ph.D. degree (24); (d) the high-school teachers felt that more items (16) affected them personally than did administrators (7); (e) those without military status felt that more items (29) affected them personally than did those with military status (19); (f) graduates from teachers colleges felt that more items (24) affected them personally than did those graduated from universities (16) and those graduated from private colleges (6). (g) Those with teaching experience in communities of less than 2,500 felt that more items (18) affected them personally than did those from teaching communities of 39,000 to 150,000 (8), 10,000 to 39,000 (6), 2,5000 to 10,000 (4), and over 150,000 (3). (h) Those from communities of less than 2,500 felt that more items (33) affected them personally than did those from communities of 10,000 to 39,000 (8), 2,500 to 10,000 (5), and those from communities of over 150,000 (2). (i) Those with over

ten years of teaching experience felt that more items (11) affected them personally than did those with five to ten years of teaching experience (9), those with two to five years of teaching experience (7), those with less than one year of teaching experience (5), and those with one to two years of teaching experience (3).

It may be observed from these frequencies that

1. Not all of the possible sources of satisfaction were felt to affect the respondents personally.
2. That more items were felt to affect the respondents personally than were felt to affect the total teaching population.
3. There seemed to be some reason to believe, in summarizing the data concerning the possible sources of satisfaction, that the number of items which were felt to affect the respondents personally, according to this sample, were due in part to differences in the several background factors. In brief, the same conclusions could be drawn from each of the background factors for these possible sources of satisfaction as were drawn for items felt to affect the total teaching population, with this exception: the greater the amount of education, the less the number of items felt to affect the respondents personally.

In an analysis of the possible sources of annoyance and satisfaction considered in terms of the question "How often does this want/expectancy affect you?" one finds that

1. Of the total number of possible sources of annoyance, 155 or 93% were felt to affect the respondents frequently.
2. Of the number which were felt to affect the respondents frequently, 39% of the items which were possible sources of annoyance from the standpoint of what teachers thought was expected of them and 62% of the items which were possible sources of annoyance from the standpoint of what teachers wanted were felt to affect the respondents frequently.
3. Of the total number of items in each category which were considered possible sources of annoyance from the standpoint of what teachers wanted and what they thought was expected of them, all of the items referring to the child, 94% of the items referring to the curriculum, 91% of the items referring to the teacher-personnel relationships, and 53% of the items referring to the physical plant were felt to affect the respondents frequently.
4. Ninety-seven percent of the total number of items which were possible sources of annoyance from the standpoint of what teachers wanted and 86% of the total number of items which were possible sources of annoyance from the standpoint of what teachers thought was expected of them were felt to affect the respondents frequently.
5. When thses responses were considered in terms of the background factors of sex, marital status, educational background, type of position, military status, type of teacher training institution, size of teaching community, size of home community, and length of teaching experience, it was found that (a) men felt that more items (139) affected them frequently than did women (102); (b) the married respondents felt that more items (138) affected them frequently than did the single respondents (113); (c) those with less than the M.A. degree felt that more items (140) affected them frequently than did those with less than the Ph.D. degree (81); (d) the high-school teachers felt that more items (113) affected them frequently than affected administrators (50); (e) those without military status felt that more items (132) affected them frequently than did those with military status (104); (f) those graduated from teachers colleges felt that more items (120) affected them frequently than did those graduated from private colleges (79) and universities (73). (g) Those with teaching experience in communities of less than 2,500 felt that more items (103) affected them frequently than did those from communities of 39,000 to 150,000 (66), 2,500 to 10,000 (22), 10,000 to 39,000 (40), and over 150,000 (11). (h) Those from communities of less than 2,500 felt that more items (111) affected them frequently than did those from communities of 10,000 to 39,000 (55), 2,500 to 10,000 (37) and over 150,000 (32). Those with five to over ten years of teaching experience felt that more items (107) affected them than affected those with two to five years of teaching experience (36), those with less than one year of teaching experience (34), and those with one to two years of teaching experience (26).

In an analysis of the possible sources of satisfaction in teaching considered in terms of this same question, namely, "Does this want/expectancy affect you?" one finds that

1. Almost all (98%) of the 47 items which were possible sources of satisfaction both from the standpoint of what teachers wanted and what they though was expected of them were felt to affect the respondents frequently.

2. Twenty-eight percent of the items which were felt to affect the respondents frequently, were possible sources of satisfaction from the standpoint of what teachers wanted, and 72% of the items which were possible sources of satisfaction from the standpoint of what teachers thought was expected of them were felt to affect the respondents frequently.
3. Of the total number of items in each category which were considered possible sources of satisfaction from the standpoint of what teachers wanted and what they thought was expected of them, it was found that all of the items referring to the child, to teacher-personnel relationships, and to the physical plant, and 96% of the items referring to the curriculum were felt to affect the respondents frequently.
4. All of the items which were considered possible sources of satisfaction from the standpoint of what teachers wanted and 97% of the items which were possible sources of satisfaction from the standpoint of what teachers thought was expected of them were felt to affect the respondents frequently.
5. When these responses were considered in terms of the background factors, it was found that the men felt that more items (43) affected them frequently than did the women (33); the married respondents felt that more items (45) affected them more frequently than did the single respondents (40); those with less than the M.A. degree felt that more items (46) affected them frequently than did those with less than the Ph.D. degree (34); high school teachers felt that more items (42) affected them frequently than did administrators (28); those with military status felt that more items (44) affected them frequently than did those with military status (39); those graduated from universities felt that more items (42) affected them frequently than did those graduated from teachers colleges (40) and private colleges (28). Those with teaching experience in communities of less than 2,500 felt that more items (38) affected them frequently than did those from teaching communities of 39,000 to 150,000 (29), of 10,000 to 39,000 (16), of 2,500 to 10,000 (12), and over 150,000 (5). Those from communities of less than 2,500 felt that more items (40) affected them frequently than did those from communities of 10,000 to 39,000 (26), 2,500 to 10,000 (13), and those from communities of over 150,000 (13). Those with over ten years of teaching experience felt that more items (43) affected them frequently than did those with five to ten years of teaching experience (37); those with two to five years of teaching experience (20); those with one to two years of teaching experience (16); and those with less than one year of teaching experience (11).

In an analysis of the possible sources of annoyance or satisfaction in teaching, considered in terms of the question, "How strongly do you feel about this?" one finds that

1. The respondents felt very strongly about all of the items which were possible sources of satisfaction.
2. The respondents felt very strongly about the 59% of the items which were annoyances from the standpoint of what teachers wanted and the 41% of the items which were annoyances from the standpoint of what teachers thought was expected of them.
3. The respondents felt very strongly about all of the items in each category.
4. There was no difference in the number of items about which the respondents felt very strongly when these responses were considered in terms of sex, marital status, educational background, and military status, but the differences which seemed to exist were due, perhaps, in part to differences in the remaining background factors. In brief, the same conclusions could be drawn for differences arising from the remaining background factors for these possible sources of annoyance as were drawn for items felt to affect the respondents frequently with this added remark, high-school teachers, those graduated from teachers colleges, those with teaching experience in communities of less than 2,500 felt very strongly about every item.
5. When these responses were considered in terms of the background factors, the men and women, the married and single respondents, those with less than the M.A. degree, and those with less than the Ph.D. degree, the high-school teachers, those with and without military status, those graduated from teachers colleges, and those with teaching experience in communities of less than 2,500, felt very strongly about every one of these items.

The high-school teachers felt very strongly about more items (168) than did the administrators (153), while the graduates from the universities felt very strongly about more items (168) than did the graduates from private colleges (159). Those with teaching experience in communities of 39,000 to 150,000 felt very strongly about more items (142) than those from com-

munities of 10,000 to 39,000 (102), those from communities of 2,500 to 10,000 (68) and those with teaching experience in communities of over 150,000 (24). Those from communities of less than 2,500 felt very strongly about more items (166) than did those from communities of 2,500 to 10,000 (62), 10,000 to 39,000 (144), and over 150,000 (81). Those with over ten years of teaching experience felt very strongly about more items (167) than did those with five to ten years of teaching experience (162), those with two to five years of teaching experience (103), those with one to two years of teaching experience (77), and those with less than one year of teaching experience (41).

In an analysis of the possible sources of satisfaction in teaching considered in terms of this same question, one finds that

1. The respondents felt very strongly about 47 items which were possible sources of satisfaction from the standpoint of what teachers wanted and what they thought was expected of them.
2. Of this number, the respondents felt very strongly about 28% of the items which were possible sources of satisfaction from the standpoint of what teachers wanted, and 72% of the items which were possible sources of satisfaction from the standpoint of what teachers thought was expected of them.
3. The respondents felt very strongly about each of the items in each of the categories.
4. When these responses were considered in terms of the background factors, it was found that the men and women, the married respondents, those with less than the M.A. degree and those with less than the Ph.D. degree, those with and without military status, those graduated from teachers colleges and universities, those with teaching experience in communities of less than 2,500, and those with over ten years of teaching experience, felt very strongly about every item which was considered a possible source of satisfaction. The single respondents and the administrators felt very strongly about the same number of items (46).

Those graduated from private colleges felt very strongly about less items (41) than did those from other types of teacher training institutions. Those with teaching experience in communities of 39,000 to 150,000 felt very strongly about more items than did those with teaching experience in communities of 2,500 to 10,000 (14), 10,000 to 39,000 (32), and over 150,000 (7). Those from communities of less than 2,500 felt very strongly about more items (46) than did those from communities of 10,000 to 39,000 (39), from communities of over 150,000 (22), and those from communities of 2,500 to 10,000 (14). Those with five to ten years of teaching experience felt that more items (34) affected them frequently than those with two to five years of teaching experience (30), those with one to two years of teaching experience (30), those with one to two years of teaching experience (21), and those with less than one year of teaching experience (14).

There seemed to be some reason to believe that there was no difference in the number of items about which the respondents felt very strongly when these responses were considered in terms of sex, educational background, and military status, but that differences which seemed to exist were due, in part perhaps, to differences in the other background factors. The same conclusions could be drawn for difference arising from the background factors for these possible sources of satisfaction as were drawn for items felt to affect the respondents personally, with these exceptions: (a) there was very little difference in the number of items about which the married and single respondents felt strongly; (b) there was very little difference in the number of items about which high-school teachers and administrators felt strongly; (c) those graduated from teachers colleges and universities felt very strongly about all items, while those graduated from private colleges did not feel strongly about so many; and (d) those with teaching experience in communities of less than 2,500 and those with over ten years of teaching experience felt very strongly about all items.

In an analysis of the possible sources of annoyance and satisfaction in teaching, considered in terms of the question, "How sure are you of your responses?" one finds that

1. The respondents were very sure of their responses to each of the possible sources of annoyance.
2. The respondents felt very sure of their responses to the 59% of the items which were possible sources of annoyance from the standpoint of what teachers wanted and the 41% which were annoyances from the standpoint of what teachers thought was expected of them.
3. The respondents were very sure of their responses to each of the items in each category.

When these responses were analyzed in terms of the background factors of sex, marital status, educational background, type of position, military status, type of teacher training institution, size of home community, and length of teaching experience, it was found that the men, the married respondents, those with less than the M.A. degree and those with less than the Ph.D. degree, high-school teachers, those with and without military status, those with teaching experience in communities of less than 2,500, and those from communities of less than 2,500, were very sure of their responses to these items.

The men felt very sure of their responses to

more items (169) than did the women (155), while the married respondents were sure of their responses to more items (168) than the single respondents (166). High-school teachers were very sure of their responses to more items (168) than were administrators (129) while the graduates from teachers colleges and universities were very sure of their responses to more items (167) than were the graduates from private colleges (125). Those with teaching experience in communities of 39,000 to 150,000 felt very sure of their responses to more items (142) than those from teaching communities of 2,500 to 10,000 (14), 10,000 to 39,000 (17), and over 150,000 (12). Those from communities of 10,000 to 39,000 were very sure of their responses to more items (142) than were those from communities of 2,500 to 10,000 (36) and over 150,000 (139). Those with more than ten years of teaching experience felt very sure of their responses to more items (163) than those with five to ten years of teaching experience (128), those with two to five years of teaching experience (109), those with teaching experience of one to two years (97), and those with less than one year of teaching experience (61).

One can conclude, in terms of the above frequencies, that

1. The respondents felt very sure of their responses to more items than were (a) considered possible sources of annoyance or satisfaction; (b) felt to affect the teaching population; and (c) felt to affect the respondents personally.
2. The number of items which were provocative of positive responses, were due perhaps in part to differences in the several background factors. There were no differences when those responses were considered in terms of educational background and military status. The same conclusions could be drawn for differences arising from the remaining background factors as were drawn for items felt to affect the respondents personally with these added exceptions: (a) the greater the amount of education, the less the number of items which were provocative of positive responses; (b) there was no difference in the responses of the men, the married respondents, the high-school teachers, nor those with teaching experience in communities of less than 2,500; and those from communities of less than 2,500 were very sure of their responses to these items; (c) there was no difference in the responses of those graduated from teachers colleges and universities who felt very sure of their responses to these items, but there was a difference between them and those graduated from private colleges.

In an analysis of the possible sources of satisfaction in teaching, considered in terms of this same question, one finds that

1. The respondents were very sure of their responses to each of the items which were considered possible sources of satisfaction.
2. Twenty-eight percent of the items which were provocative of feelings of positivity were possible sources of satisfaction from the standpoint of what teachers wanted, and 72% were possible sources of satisfaction from the standpoint of what was expected of them.
3. The respondents were very sure of their responses to each item in each of the categories.
4. There seemed to be some reason to believe, in summarizing the data concerning the possible sources of satisfaction, that the number of items which were provocative of positive responses, according to this sample, were due perhaps in part to differences in the several background factors. In brief, (a) there were no differences in these responses when they were considered in terms of marital status, educational background, and military status; (b) there was no difference in the responses of the men, the high-school teachers, and those from communities of less than 2,500 who were very sure of their responses to all items; (c) there was no difference in the responses of those graduated from teachers colleges and universities, but they were very sure of their responses to more items than were those graduated from private colleges; (d) with the above exception, the same conclusions could be drawn for differences arising from these background factors as were drawn for items felt to affect the respondents personally.
5. When these responses were considered in terms of the background factors, it was found that the men, the married and single respondents, those with less than the M.A. degree and those with less than the Ph.D. degree, high-school teachers, those with and without military status, and those from communities of less than 2,500, felt very sure of their responses to all items.

The women were very sure of their responses to less items (45) than the men(47). Administrators were very sure of their responses to less items (30) than high-school teachers (47). The graduates from teachers colleges and universities were very sure of more items (46) than those graduated from private colleges (36). Those with teaching experience in communities of less than 2,500 were very sure of their responses to more items (46) than were those

from teaching communities of 39,000 to 150,000 (39), 10,000 to 39,000 (4), and 2,500 to 10,000 (2). Those from communities of 10,000 to 39,000 were very sure of their responses to more items (30) than were those from communities of 2,500 to 10,000 (7) and over 150,000 (6). Those with more than ten years of teaching experience were very sure of their responses to more items (44) than were those with two to five years of teaching experience (36), one to two years of teaching experience (24), five to ten years of teaching experience (19), and less than one year of teaching experience (15).

In brief, it may be said that

1. There was no one possible source of satisfaction or annoyance in teaching.
2. There were actually 168 out of 215 items which were possible loci of annoyance.
3. That possible sources of annoyance arose more out of what they thought was expected of them.
4. That certain categories contained a higher percentage of annoyance than others: 87% of the items referring to the physical plant, 82% of the items referring to the child, 55% of the items referring to teacher-personnel relationships, and 36% of the items referring to the curriculum were possible loci of annoyance from the standpoint of what teachers wanted and what they thought was expected of them.
5. The background of the respondents: sex, marital status, educational background, type of position, military status, type of teacher training institution, size of teaching community, size of home community, and length of teaching experience appeared to color their responses. (a) The men were annoyed with more items than the women; the women, however, were annoyed more frequently with items referring to the child and to teacher-personnel relationships; (b) the married respondents were annoyed with more items than the single respondents; the single respondents were annoyed with more items referring to the child than to items in any other category; (c) those with less than the M.A. degree were annoyed with more items in each category than were those with less than the Ph.D. degree. This latter group found more items referring to the child annoying than from any other area; (d) high-school teachers felt that items from every area were annoying while administrators considered only one item from the area of teacher-personnel relationships and one from the physical plant annoying; (e) those without military status found more items annoying in all areas than did those with military status; (f) none of the items referring to the physical plant were annoying to graduates from universities and private colleges, and only one item referring to teacher-personnel relationships was annoying to university graduates. In other areas, these graduates found many less items annoying than did the graduates from teachers colleges who were annoyed with items from every category. The graduates from teachers colleges were annoyed with more items referring to the child than with items referring to the curriculum and the physical plant. They were annoyed with more items referring to teacher-personnel relationships than were graduates from other types of teacher-training institutions; (g) those with teaching experience in communities of less than 2,500 were annoyed with many more items than were those with teaching experience in communities of any other size. Those with teaching experience in communities of 2,500 to over 150,000 did not consider any of the items referring to the physical plant annoying. Only three items referring to the curriculum were annoying, and only five items referring to teacher-personnel relationships were annoying. Annoyances, however, did occur in the category referring to the child for all these groups; (h) teachers from communities of less than 2,500 were annoyed with items from every category while those from communities of 2,500 to 39,000 were not annoyed with any of the items referring to the physical plant, the curriculum, and teacher-personnel relationships. What items were annoying came from the category referring to the child. There were three items in each of the categories referring to the child, to the curriculum and to teacher-personnel relationships which were annoying to those from communities of over 150,000. None of the items referring to the physical plant were annoying to this latter group; (i) the more the experience, the larger the number of annoyances in each area, with the larger number of possible sources of annoyances coming from the category referring to the child. Those with less than five years of teaching experience found that none of the items referring to the physical plant were annoying; they found only one item referring to teacher-personnel relationships annoying, and only four items referring to the curriculum were annoying. Those with less than one year to over ten years of teaching experience found items referring to the child annoying.
6. In considering the possible loci of satisfaction, it may be said that: (a) there were 49 frequently mentioned sources of satisfaction; (b) these possible sources of satisfaction arose more out of what teachers thought was expected of them than out

of what they wanted; (c) 50% of the possible sources of satisfaction came from the category referring to the curriculum, 34% referred to teacher-personnel relationships, 12% referred to the child, and but 2% referred to the physical plant.

Satisfactions and annoyances grow both from situations and persons. Some persons tend to be annoyed with many more items than others; some situations are doubtless more annoying or more satisfying than others.

A
INV
TO

A. The P

The i
has cont
tion and
ic age.
thrust of
our phys
great de
standard
enjoyed
with this
plex soc
in prepa
required

This
problem
all other
of young
instituti
wide ra
constant
leges a
ment of
have ma
provide

It wa
of youth
greater
cation,
is given
istratio
mendati
Higher
lege of
school

This
knockin
has stir
problem
educati
the ligh

A REVIEW AND INTERPRETATION OF INVESTIGATIONS OF FACTORS RELATED TO SCHOLASTIC SUCCESS IN COLLEGES OF ARTS AND SCIENCE AND TEACHERS COLLEGES

HARLEY F. GARRETT
University of Mississippi
University, Mississippi

SECTION I

INTRODUCTION

A. The Problem Stated and Techniques Outlined

The ideal of free public education in America has contributed greatly to the industrial revolution and the development of our modern scientific age. The spiral of invention and the steady thrust of scientific research into the nature of our physical universe, has released man from a great deal of his former drudgery and raised the standard of living of the average man to a height enjoyed by the citizens of no other country. But with this has naturally come an increasingly complex society requiring longer periods of training in preparation of the technical and social skills required in our modern age.

This phenomenal development has created its problem in the educational world as well as in all other areas. The greatly increasing numbers of young people who are seeking entrance into our institutions of higher learning, their increasingly wide range of aptitudes and abilities, and the constantly increasing part that schools and colleges are expected to play in the total development of citizenship and personality of youth, have made it difficult for these institutions to provide adequately for those who seek admission.

It was inevitable that the greater the number of youth receiving elementary education, the greater would be the demand for secondary education, and, in turn, college training. This trend is given current impetus by the Veterans Administration educational program, and the recommendation of the President's Commission on Higher Education which urges enrollment in college of up to sixty percent of all secondary school graduates by 1960.

This relatively sudden flood of eager youth knocking at the gates of our higher institutions has stimulated progressive thinking to attack the problem. The philosophy and purpose of higher education must be re-evaluated and considered in the light of curricula of sufficient breadth and variety to meet the needs of the increasing enrollments and wider range of abilities and interests.

However, breaking tradition is never easy, and it was difficult for many to give up the original concept of a college or university as an exclusive institution in which highly selected individuals were to receive concentrated training in a narrow curriculum. This concept prevails stubbornly in spite of mounting evidence that some college entrance requirements are invalid in their attempt to predict college success and thus are unfair to many worthy young people; and that the college could and should broaden its curriculum to attract students of many kinds of abilities other than the purely academic.

Besides the broad problem of articulating secondary and higher education, there is the necessity of measuring the student's potentialities and predicting as early as possible his probable success in college at the time he enters and to help him become placed in the fields of learning or training for which is is best fitted and from which he will derive the most benefit.

Thus, the opposing theories of restricting college attendance by rigid college entrance requirements, versus the idea of permitting all to enter a college of broad offerings, has provoked a considerable body of investigations and reports during the past few years. The problem of this study is to summarize in one volume, a wide sampling of these reports.

Since this problem is related so closely to the matter of college entrance requirements, the present study presents first a short history of that subject, pointing out the changes that have been made in the light of changing philosophies of education and data from educational research, testing the validity of certain college entrance requirements of long standing and their ability to select college entrants satisfactorily as they were formerly thought to do. Consideration is then given to the measurement techniques and predictive factors that have been discovered and the extent to which they have been able to meet this problem.

Because of the scope of the problem, the present study is limited to a consideration of studies covering only colleges of liberal arts and teachers colleges. Materials for the study were obtained wherever possible from original reports. Otherwise, articles appearing in leading educational and professional publications were used and credit given for all references and quotations.

The criterion of college success in practically all cases was college marks received for a given period of time, usually the first semester, quarter, or year, although a few studies included the entire four years. These marks were nearly always transmuted to honor point averages or ratio by arbitrarily assigning a numerical value to each letter grade received and dividing this total by the number of college hour credits received. The coefficient of correlation between factors and the criterion was the usual means of showing relationships, and the predictive value of the factor was inferred from the size of the coefficient. Since relatively few of the writers subjected their data to finer statistical analyses such as the test for linearity of regression, correction for attenuation and alienation, only raw or uncorrected coefficients of correlation are reported in the present summary unless otherwise noted.

B. The History of College Entrance Requirements in America

Changes in college entrance requirements in America during the seventeenth century practically parallels those of Harvard College which was founded in 1636. Proficiency in Latin and Greek were the only academic requirements for admission until the middle of the eighteenth century. About 1870, the old colonial college with its medieval traditions and narrow curriculum was rather rapidly transformed into the modern university with many new subjects and the elective system. Uniformity of admission disappeared, but there was a definite trend toward tests of power rather than the acquisition of facts as entrance requirements.

However, colleges were reluctant to give up the classics as the first requirement, and the academy became the college preparatory school and the new high school was frankly regarded as the "people's college" for those not going to college. It was when graduates of the high school insisted on admission to college that the problem of articulation arose.

The first attempt at colleges and preparatory schools getting together was the New England Association of Colleges and Preparatory Schools organized in 1885, with 73 institutions enrolled. Out of this grew the Commission of Colleges in New England on Entrance Examinations. The second such organization was the Association of Colleges and Preparatory Schools in the Middle States and Maryland in 1892. Other such organizations were the Association of Colleges and Preparatory Schools of the Southern States, 1895; and the North Central Association of Colleges and Secondary Schools in 1895. These four with the famous Committee of Ten on Secondary School Studies, and the Committee on College Entrance Requirements of the National Education Association, did great pioneering in securing uniformity in admission requirements.

The College Entrance Examination Board grew out of the Committee of Ten, 1896, with first examinations given in 1901. In 1943, a total of 23,281 candidates took the examinations in 312 centers. Forty-eight colleges are members of the Board. In 1911, Harvard first permitted entrance by the new plan of examination in some prescribed and some elective subjects, thus reducing the extent to which the college dictates curricula to secondary schools. Since 1916, the College Entrance Examination Board has set such examinations.

The psychological examination for selecting candidates for admission was introduced by Columbia University in 1919, following its success in 1918 of selecting candidates for the Student's Army Training Corps by requiring them to take the Thorndike Tests for Mental Alertness. The new plan resulted in larger enrollments from a wider geographical range, and provided increasingly accurate prediction of college success.

The necessity for a uniform system of measuring secondary school preparation grew out of confusion as to the definition of the terms "credit", "unit", and "point". In 1902, the North Central Association defined the unit as a "course covering a school year of not less than 35 weeks with four or five periods at least 45 minutes each week." In 1906, the Carnegie Foundation for the Advancement of Teaching adopted this definition, and because of the influence of the organization the unit became known as the "Carnegie Unit", which is practically universal today. The same organization defined 14 units as the minimum amount of preparation in four years of academy or high school. In 1911, the National Education Association recommended 15 units, and this latter number became universally adopted.

A comparison of McKowan's findings in 1924 (26) and those of Brammell in 1932 (4), show little change in the requirements of English, mathematics or social science. The trend toward less units of foreign language required continued during the period with the exception of those institutions in northeastern United States. Tomlinson (39) studied entrance requirements in 318 colleges from 1932 to 1944, and found that 42 percent had made no change in requirements during these years. Forty percent had liberated their admission requirements, while eighteen percent had made them less liberal. Thus is shown the continued reluctance to modify entrance requirements in spite of the mount-

ing evidence as to the lack of validity of some college entrance requirements. The following sections will summarize some of the studies which have been made to determine the validity of these college entrance requirements.

SECTION II

HIGH SCHOOL SCHOLARSHIP AND PATTERN OF SUBJECTS TAKEN AND THE RELATION OF THESE FACTORS TO COLLEGE SUCCESS

A. High School Average as a Predictor

Among all the factors contributing to prediction of scholastic success in college, the student's average grade in high school continues to show the highest correlation with later college scholarship average. This seems to hold true whether the reports be of individual investigations or summaries of several like studies.

The tendency is all the more convincing when the coefficients of correlation continue high in spite of variation in the weightings used to reduce high school grades to comparable averages, the size of the group studied, kinds of marking systems used, the length of college course considered as a criterion, and other factors which make it difficult to reduce the material to comparable data.

The present summary of 32 coefficients of correlation range from .29 to .83 and have a median of .56. Douglass (83) summarized 67 studies made before 1931 and found the reported coefficients of correlation between high school averages and college scholarship averaged .54. Symonds (37) reported a summary average of .47 for the 28 studies which he summarized in 1929.

Comprehensive studies involving many high school graduates and their records in several colleges or universities are most numerous. Clem (9) in 1922, found the relationship to be as follows in four institutions: Carnegie Institute, .29; Columbia University, .45; Cornell University, 147; and Ohio State University, .38. Odell (139) studied the record of 2,000 Illinois high school graduates in college in 1924, and found the correlation with the criterion to be .55. Pierson (146) in 1928, reported a coefficient of correlation of .52 between Los Angeles high school graduates and their college marks.

Tribilcock (179) checked the success of 651 high school graduates in many colleges and universities in 1938. In Table I is shown the relative number of college hours carried and the average grade made by these graduating in the top third, middle third, and lowest third of their high school classes. The table clearly shows the most hours and best grades declining uniformly from the top third to the lowest third. He makes the following conclusions:

1. Raising the requirements necessary to obtain a recommendation to college is not warranted in the light of the past and current performance of our graduates.

2. Colleges are right in anticipating that the most unsatisfactory results will come from students of low rank in high school.

3. Colleges which impose an admission standard of scholarship considerably above a minimum passing grade are probably excluding students who are capable of satisfactory work.

4. Colleges which take students without regard to their high school rank are performing a real educational service in many cases, in-as-much as they open the door of opportunity to many who otherwise would find themselves cut off from a college career. These students can either remain and graduate from such an institution or, on establishing their ability to do college work, can transfer to the first instance.

5. While it is wasteful and otherwise undesirable to have the unfit in college, it is also wasteful and otherwise undesirable to keep the fit out of college. For many students there is no adequate test of fitness except the actual attempt to carry college work. (P. 546)

Garrett (103) reported in 1944 that the high school record of 200 graduates of the Warren G. Harding High School of Warren, Ohio, correlated .67 - .027 with first semester average in 52 different colleges attended by these graduates.

Finch and Nemzek (96) at the University of Minnesota High School in 1934 found the coefficient of correlation between high and college grades to be .77. However, in this study, high school records from only one high school were used where the grading system was uniform, and was based upon superior measurements. This shows the added advantage of measuring both college success and high school record in the same institutions. It also gives added weight to the supposition that if all high school grades and all college grades could be reduced to comparable bases throughout the nation, a student's probable success in college could be much more accurately predicted, since correlations between high school and college work would presumably yield higher coefficients.

1. Studies within Single Institutions of Higher Learning

The most popular type of study is that made within a single institution, of grades made in that institution by students from many high schools or preparatory schools.

a. First Semester or First Quarter College Grades as a Criterion

Using first semester or first quarter college averages as a criterion seemed to be most pop-

TABLE I

SUMMARY OF COLLEGE GRADES RECEIVED BY THE RESPECTIVE THIRDS
651 CASES (AFTER TRIBILCOCK (179))

	Total No. Hrs. Carried	%A	%B	%C	%D	%E (F)	Total
Highest Third	4362	22.5	38.9	31.9	6.1	.5	100
Middle Third	3100	7.3	27.8	44.6	16.2	4.1	100
Lowest Third	2002	4.1	24.2	44.1	16.3	10.7	100

TABLE II

STUDIES IN THE CORRELATION OF AVERAGE HIGH SCHOOL SCHOLARSHIP WITH COLLEGE AVERAGE

Date	Reference	Institution	Variable	No. of Subjects	Time	r
1921	Scates (164)	Chicago Univ.	H.S. Ave.	1707	1 yr.	.61
1921	Cocking & Holy (10)	Ohio Univ.	H.S. Ave.	266	1 yr.	.55
1922	Beatley (51)	Harvard Univ.	H.S. Ave.	423	1 yr.	.56
1922	Henderson (19)	Columbia Univ.	H.S. Ave.			.45
1922	"	Carnegie Inst.	H.S. Ave.			.29
1922	"	Ohio Univ.	H.S. Ave.			.38
1923	Anderson & Spencer (42)	Yale Univ.	H.S. Ave.	402	4yrs.	.44
1922	Symonds (37)	Hawaii Univ.	H.S. Ave.		1 sem.	.55
1923	Somers (35)	Colorado S. T. C.	H.S. Ave.	212	1 sem.	.83
1924	Proctor (150)	Standford Univ.		473	1 qtr.	.45
1924	Odell (139)	Illinois Univ.		2000	1 yr.	.55
1924	"	Illinois Univ.		2000	4 yrs.	.54
1927	Douglass (83)	Oregon Univ.		385	5 sem.	.56
1927	Jones (123)	Indiana S. T. C.	H.S. Ave.	325	1 sem.	.56
1927	"	Indiana S. T. C.	H.S. Ave.	325	1 yr.	.60
1928	Pierson (146)	"College"	H.S. Ave.	50		.52
1928	Hartson (16)	Oberlin College				.55
1928	"	Oberlin College		Women	1 sem.	.46
1929	Whitney (187)	Colorado S. T. C.		899	2 yrs.	.50
1930	Prosser (30)	Iowa Univ.		280	1 sem.	.51
1931	Crawford & Burnham (77)	Yale Univ.		3277	1 yr.	.57
1931	Patterson (143)	Minnesota Univ.		309		.31
1931	"	Minnesota Univ.		229		.45
1932	Hartson (112)	Oberlin College		150 w.	1 sem.	.47
1932	"	Oberlin College		120 m.	1 sem.	.45
1934	Finch & Nemzek (96)	Minnesota Univ.		90	1 yr.	.79
1935	Byrns & Henmon (96)	Minnesota Univ.		250	1 sem.	.72
1936	Read (151)	Wichita Univ.	H.S. Ave.	400	1 sem.	.63
1936	"	Wichita Univ.	H.S. Ave.	400	2 sem.	.64
1936	"	Wichita Univ.	H.S. Ave.	400	1 yr.	.67
1935	Garrett (103)	52 Colleges	H.S. Ave.	200	1 sem.	.67±.027
		Number of coefficients = 32				
		Range = .29 to .83				
		Median = .56				

ular, probably due to the ease with which such data are gathered. Cocking and Holy (10) reported this coefficient to be .55 at Ohio State University in 1921. Symonds (37) in 1922, reported exactly the same at the University of Hawaii. At Stanford University in 1924, Proctor (11) found the relationship to be .45 for men and .52 for women, for first quarter scholarship. Jones' (123) figure at Indiana State Teachers College in 1927-28 was .56, among freshmen preparing to become teachers at the end of the year. He suggested that the motivation among this select group with definite vocational goals may have influenced their grades in college.

Prosser (30) reported that 280 women's first semester averages at the University of Iowa correlated .51 with the high school average in 1930. Clark (72) at Northwestern University in 1931, reported correlations of .51 to .58 for men, and from .53 to .59 for women. Read (151) at Wichita University found a coefficient of correlation of .63 in 1936. The median coefficient of correlation in these seven studies is .548.

b. First Year College Grades as a Criterion

Reports of correlations between high school average and first year college average show substantially higher coefficients. They run as follows: Scates (164) . 61; Odell (139) . 55; Jones (123) . 60; Whinery (186) . 50; Crawford (76) . 57; Finch and Nemzek (92) . 77; and Read (151) . 67. Whinery says:

> As a result of the cumulative evidence of these continuation studies, Colorado State Teachers College adopted, in September, 1929, new entrance requirements which disregard the details of the subject content of the high school curriculum, but place major stress on rank of total achievement in secondary school work and on native intelligence of the entering high school graduate. (P. 674)

Read (151), concluded from his study at Wichita Municipal University in 1936:

> When we attempt to predict averages for the entire freshman year, the high school average is the best single criterion available at the first of the year. (P. 188)
>
> It seems important to note. . . . . that in any situation such as a municipal university with many students coming from the same school system, prediction of the first semester average, certainly to the extent of placing the upper, middle, or lower third of the freshman class, can be made the basis of high school average alone. (P. 188)

c. More Than One Year College Grades as a Criterion

Some of the coefficients of correlation between high school grades and more than one year of college work, are: Anderson and Spencer (42) Yale, 4-year average, . 54; Odell (139), various colleges 4-year average . 54; Douglass (83) University of Oregon, five consecutive semester averages, . 56; Pierson (145) grades of Los Angeles High School in college in 1928, . 52; Hartson (110) 1932, Oberlin College, student college grade, . 47 for women, and . 52 for men; Byrns and Henmon (67) University of Wisconsin, 1935, . 74 (a very high correlation with no apparent explanation). The median of these seven coefficients is . 53.

From this limited number of studies it would appear that high school average predicts first year college average better than the college average of any lesser or greater part of the total college course.

2. Other Studies

The relative value of high school average scholarship as a predictive measure is brought out by some of the writers. Beatley (51) observed that the coefficient of correlation of .56 between high school average and first and second year averages at Harvard in 1922, was greater than the coefficients of correlation of .50 and .45 between College Entrance Examination Board examination scores, and the first and second semester grades, respectively. Crawford (76), when he found the high school average and first year average of 3,277 freshmen at Yale between 1931 and 1934, to be correlated .51, observed: "At Yale, freshman average consistently correlates better with secondary school grades than they do with the College Board Examination average." (P. 345)

Kaulfers (124) summarized six studies made up to 1931 between high school average in all subjects and college achievement in foreign language. He found the highest coefficient to be .57 and the lowest .37 with a median of .52.

A summary of the studies above which reported coefficients of correlation between high school and college scholarship, is given in Table II.

B. Other Methods or Reporting High School Achievements

1. High School Rank

Rank in high school graduating class, based upon grade, has been used by some investigators as a basis of high school record instead of the usual grade average.

2. Percentile Rank

Although the percentile rank is influenced by the varying numbers in graduating classes, the reports of this method and the resulting coefficients of correlation with college average include, Goldthorpe (106), Northwestern University, 1920, .62, with first year college grades; Johnson (121) University of Minnesota, 1921, .63; Fricken (101) Macalester College, grade point average at the end of the first semester of 1928, 1929, and 1932: men, .69, women .69, and all, .68, and for the four-year average for all, .67; Crawford (75), Yale, 1929, first year of college, .61, and in a later study, .57; Williams (189), University of Minnesota, 1926, .68 for men and .53 for women; Patterson (143), College of Education, University of Minnesota, .268 for those entering the College of Literature and Arts, and .44 for transfer students; Douglass and Lovegren (84), University of Minnesota 1936, .425; Williamson and Freeman (190), University of Minnesota, .47, .45, and .52 for three groups studied between 1933 and 1934; Butsch (65) Marquette University, between 1934 and 1937, .56; Seyler (167) College of Liberal Arts, University of Illinois, 1935, 1936, and 1937, .60. The median of these eighteen coefficients of correlation between high school percentile rank in graduating class and later college record, is .575.

Clark (72) at Northwestern University in 1931, studied the relative predictive value of high school average and high school percentile rank, and found a .10 point advantage for average grades, and a correlation of .768 between the two factors. However, he says:

> In conclusion, these data do not indicate a convincing superiority of high school rank over average, or of average over rank, for selecting freshmen who will make good grades in college. (P. 766)

Seyler (167) in his study referred to above, concluded:

1. . . . . in order to predict a most probable average of at least 3.000 (grade of C) for a student entering Liberal Arts and Science, he must have at least a percentile rank of 58 in his high school graduating class.

2. . . . . the probable scholastic average that would be made during the first year in college by a freshman with a percentile rank of 50 in his high school class, would be 2.8535 with a standard error of estimate of .6692; and the chances are 68 in 100 that the actual average would fall within the limits of $2.8535 \pm .6692$ or between 3.5227 and 2.1843. (P. 16-17).

3. Quartile Rank

Martin (132) found the relation of high school quartile rank with first semester average at Trenton State Teachers College in 1936, to be .26, and .30 for the four-year college average. Requa (156) considered the quartile rank in high school and the record in Southern Branch of Idaho University in the fall of 1938, and concluded: "It is apparent that in general we can expect scholastic rank in high school to determine very largely what success the student will have in college." (P. 304)

Berg, Larsen and Gilbert (53) in 1943, reported on the progress of 79 students entering the University of Illinois College of Liberal Arts and Science from the low quarter of their respective high school graduating classes:

> Only 15% of the low quarter student earned grades above the all-freshman grade point average of 3.178, while 61% of the regular students earned above this average. (P. 54)

> The lowest quarter group was approximately one deviation below the mean of the regular group in grades and in test scores. (P. 59)

4. Other Ranking Methods

Reporting on the opposite standing in high school, Hilts (116) recently reported on the academic achievement of honor entrance scholarship holders in Chicago University in 1941 and 1942. The median grade point average made by honor entrance scholarship holder on comprehensive examinations their freshman year was 2.63, while that of the ineligible group was but 1.03, showing the obvious superiority of the scholarship group.

Ellefson (93) found the coefficient of correlation of .56 between the number of "recommended grades" in high school subjects, (mathematics, chemistry, physics, biology, foreign language, history, and English), and first semester average at the University of California in 1921-23. Segal (166) found that the total high school "A's" and "B's" correlated .42 with later junior college grades at Long Beach. Douglass (83) compared the "Principal's Quartile Rating" on scholarship ability with college average grade for five terms at the University of Oregon and found the coefficient of correlation to be .48.

A summary of the studies in the relationship between standing in high school graduating class and other qualities and later scholarship in college is given in Table III.

The 29 coefficients of correlation between rank in high school graduating class and grades in college in Table III, range from .18 to .72 with a median of .548. This would indicate that class rank, percentile or quartile rank number of "A's" and "B's", principal's ratings, and

TABLE III

STUDIES MADE OF STUDENTS' RANK IN HIGH SCHOOL GRADUATING CLASS AND THEIR GRADES IN COLLEGE

Date	Reference	Institution	Variable	No. of Students	Time	r
1920	Goldthorpe (106)	Northwestern Univ.	H.S. Rank	136	1 yr.	.62
1921	Ellefson (93)	California Univ.	H.S. Grades	143	1 sem.	.56
1921	Johnson (121)	Minnesota Univ.	H.S. %ile		1 sem.	.63
1923	"	Minnesota Univ.	H.S. %ile	men	1 sem.	.72
1923	"	Minnesota Univ.	H.S. %ile	women	1 sem.	.68
1928	Fricken (101)	Macalester College	H.S. Rank	126 w.	1 sem.	.69
1928	"	Macalester College	H.S. Rank	132 m.	1 sem.	.69
1928	"	Macalester College	H.S. Rank	both	1 sem.	.68
1928	"	Macalester College	H.S. Rank	both	1 yr.	.67
1929	Crawford (75)	Yale Univ.	H. S. Class	501 m.	1 yr.	.61
1931	"	Yale Univ.	H.S. Rank	3277	1 yr.	.57
1926	Williamson (189)	Minnesota Univ.	H.S. %ile	300 m.	1 qtr.	.68
1926	"	Minnesota Univ.	H.S. %ile	287 w.	1 qtr.	.63
1931	Segal (166)	Long Beach Jr. Col.	H.S. A's & B's	90 w.		.42
1931	Patterson (143)	Minnesota Univ.	H.S. Rank	300		.27
1931	"	Minnesota Univ.	H.S. Rank	229		.49
1927	Douglass (83)	Oregon Univ.	Principal's Quartile Rating of:			
			School Apt.	385	5 qtrs.	.48
			Industry	385	5 qtrs	.38
			Lead'ship	385	5 qtrs	.18
			Citiz'ship	385	5 qtrs	.26
1933	Williamson & Freeman (190)	Minnesota Univ.	H.S. %ile	379	1 qtr.	.47
1934	"	Minnesota Univ.	H.S. %ile	951	1 qtr.	.45
1934	"	Minnesota Univ.	H.S. %ile	283	1 qtr.	.52
1934	Douglass & Lovegren (84)	Minnesota Univ.	H.S. %ile	190		.43
1935	"	Minnesota Univ.	H.S. %ile	827	2 yrs.	.54
1936	Martin (132)	Trenton S. T. C.	H.S. Q'ile	228	1 sem.	.26
1936	"	Trenton S. T. C.	H.S. Q'ile	123	1 sem.	.30
1937	Butsch (65)	Marquette Univ.	H.S. Rank	750	1 sem.	.56
1939	Seyler (167)	Illinois Univ.	H.S. Rank	3006	1 yr.	.60
		Number of Coefficients = 29				
		Range = .18 to .72				
		Median = .548				
		S.D. = 24.66				

other methods of indicating high school scholarship are, in general, not as effective in predicting college success as is the average of high school grades, which in Table II shows a median coefficient of correlation of .56 with the criterion, among the studies reported. However, until there is a closer agreement among investigators as to the relative predictive value of these many ways of considering students' "standings" or "rank" in high school, it is not well to state that either is of better worth. The success which Douglass (83) had with principals' quartile ratings as a predictive factor, gives real promise and the technique deserves further trial to test its possibilities. Principals' ratings on other items, however, such as leadership and courtesy, proved to be of very low validity.

Other conclusions which seem justified from these studies were:

1. High school scholarship shows closer relation to college scholarship than does any other one factor, the coefficients of correlation being usually in the early fifties.

2. The records of graduates of any one particular high school show a closer correlation with this group's later success in one or many colleges, than do the records of students from several high schools with their later college record. This would indicate that coefficients of correlation in the future will rise in proportion to the improved techniques of reducing many differing high school and college grading systems to a more comparable basis.

3. High school scholarship correlates more closely with first year college record, than it does with any lesser or greater portion of the total college record.

C. The Pattern of High School Subjects Taken

The old belief so firmly held in the early period of American higher education that the pattern or number of units in particular secondary school subjects, especially foreign language, had much to do with later success in college, has yielded to studies which have almost uniformly repudiated this belief.

Gebhardt (14) studied the relation between units of high school subjects and college scholarship in 1922-23, and found:

> There is no significant evidence in this investigation to show that one subject or group of subjects is of greater value in itself than any other, as an aid to successful work. . . The evidence tends to show that two people of equal ability, studying different subjects in high school, may do college work of equal grade.

Bolenbaugh and Proctor (57), in 1926, found that the high school average students entering college with less than three vocational subjects, correlated only .28 with their college average, while the record of those entering college with three or more vocational subjects correlated .49 with their college work. The authors said: "Whatever the explanation, it is rather disconcerting to have the tradition that an academic pattern of high school work is a better index of college success than a vocational pattern so widely shaken." (P. 91)

Ellefson (93) found no correlation between number of high-school credits and college grades. May (133) found this coefficient to be .22. Nelson (137), in 1931, says: "It does appear . . . . that there seems to be less justification for requiring any specific amount of work in any subject." (P. 263)

Douglass (83) studied the relation of the number of unit credits in various high school subjects with average college marks with intelligence and industry held constant, and concluded:

> The number of units taken in any one subject matter field does not furnish any useful basis for predicting college success, all coefficients except that in foreign language being practically zero, and that exception (.17) not being sufficiently great to be of any significance. (P. 13)

Friedman (13), and Byrns and Henmon (68) reported on the number of credits in social studies, mathematics, and foreign language respectively, in high school, and their relation to college success. The latter authors said:

> The pragmatic sanction may justify the belief that foreign language and mathematics are valuable instruments of instruction, but the evidence does not indicate that they are sacrosanct. They have probably been valued out of proportion to their significance for success in college. Their prominence both in high school curriculum and in college entrance requirements must be justified on some grounds other than mental training, for the facts seem to show that these subjects do not develop a student's capacity for successful college work. (P. 104)

Reeves and Russell (32) reported that high school Latin majors made superior Latin grades in college, but achieved practically on the level with high school social science majors in college subjects outside the major.

Patterson (143) and Vaughan (181) made similar studies, the latter reporting as late as 19-

49: "To date we have found no study that supports the thesis that so called 'academic' subjects constitute a 'significantly' better preparation for entrance to college than the non-academic subjects." (P. 96)

These studies seem to prove conclusively that there is practically no relationship between the number or pattern of high school subjects and later college success.

SECTION III

ACHIEVEMENT TESTS AND COLLEGE ENTRANCE TESTS AS BASES FOR PREDICTING COLLEGE ACHIEVEMENT

A. General Achievement Tests

The factors rating second in the present summary as a basis for predicting scholastic success in college are achievement tests and College Entrance Examination Board tests. The development of the C E E B test was traced in Section II, and Eurich and Cain (12) make this conclusion in 1941:

> General achievement tests provide a close second to high school average as a single basis for predicting college scholarship. Various investigators have found the relationship between the College Entrance Examination Board Tests and general scholarship to range from .39 to .64. (P. 49)

Archer (45) found the coefficient of correlation between the Regent's average and college average of 828 scholarship holders to be .49. Whitman (188) found very little relationship between scores on the C E E B examinations and first year grades in college, with coefficients ranging from .73 to -.02 with an average of .29. Although Beatley (51) reported a .50 coefficient of correlation between C E E B scores and first year college work at Harvard in 1922, and .46 for the second year, the curriculum of preparatory schools was then still dominated by colleges, and emphasis was placed on preparing for entrance examinations. Arlitt and Hall (44) found the college entrance scores at Bryn Mawr correlated .27 with first year grades and .29 with second year grades in 1923.

Anderson and Spencer (42) found a .34 relationship between scores on examinations over subjects studied with high standing during the last year of high school, and the four-year grade average in Yale University in 1919. Condit (74) experimented with a local achievement test at Colorado State Teachers College in 1926 and found its scores correlated .46 with fall quarter or .49 with first year college scholarship. Crawford (75) found that the C E E B test scores correlated .54 with first year college work in 1929. Jones (123) in 1922-28, reported the unusually high coefficient of correlation of .63 for fall term and .86 for first year, between scores on the Indiana Composite Achievement Test and college work. The fact that his group was composed of the elementary teacher-training group in Indiana State Teachers College may have influenced the result due to the selectivity and common interest of the group.

Reeves and Russell (32) reported a correlation of .59 between scores on the Sones-Harry Achievement Test and two quarter of scholarship in Oberlin College in 1928. Prosser (30) found the Iowa University qualifying examination scores correlated .65 with first semester grades there in 1930. Nelson (137) reported a .52 correlation between Iowa High School Content Examination scores and first semester college grades. Paul (144) was thoroughly convinced of the validity of measuring the general ability and proficiency of 3,128 students with reading and English tests at Iowa State Teachers College in 1929-33, and says:

> The members of the low five percent on tests, failed in 27.8 percent of the work carried; those of high percent failed in only .3 percent. Ninety percent of the low five percent remained an average of 2.6 quarters and failed in one or more subjects; while 38 percent of them dropped out for low scholarship. Of the high five percent, only one received a failure, although all remained an average of 9.2 quarters. If graduation from a curriculum is the desired outcome of college attendance, it would appear that those located in the low 15 percent group, i.e., below the 15 percentile in all placement tests, might well be advised, under present conditions, not to enroll on a degree curriculum. Their chances of graduating from a degree curriculum is rather remote, i.e., one chance in ten. (P. 507)

Iowa High School Content examination scores correlated .44 with first terms, .38 with second term, and .43 with total year grades at Wichita Municipal University in 1936, according to Read (151). Weber (183) found a coefficient of correlation of .47 between C E E B scores and first year schooling at Wells College in 1937-41.

In 1942, the C E E B tried out April Achievement Tests in some secondary schools to replace the pre-war June Examinations. Weber (184) reported in 1944 that the new test scores correlated only .31 with freshmen grades at Wells College for 1942-44, whereas the four-year average grade had correlated with the old-type examinations .46 from 1937 to 1941. He explained this difference: "This is partly because the New April Tests are shorter (one hour each) and are taken by the candidates before the completion of the course involved and because students with different amounts of preparation take

TABLE IV

STUDIES IN THE USE OF GENERAL ACHIEVEMENT TESTS IN PREDICTING GENERAL SCHOLASTIC ACHIEVEMENT IN COLLEGE

Date	Reference	Institution	Test	No.	Time	r
1922	Beatley (51)	Harvard Univ.	CEEB Tests	423	1 yr.	.50
1922	"	Harvard Univ.	CEEB Tests	423	2 yrs.	.46
1923	Arlitt & Hall (44)	Bryn Mawr	Col. Ent. Exam.	103	1 yr.	.27
1923	"	Bryn Mawr	Col. Ent. Exam.	104	2 yrs.	.29
1923	Anderson & Spencer (42)	Yale Univ.	Yale Classif'n, New Plan	55	4 yrs.	.34
1926	Condit (74)	Colorado S.T.C.	Local Achieve.	559	1 Q.	.46
1926	"	Colorado S.T.C.	Local Achieve.	559	1 yr.	.49
1927-1928	Jones (119)	Indiana S. T. C.	Indiana Comprehensive Achieve.	325	1 sem.	.63
1927-1928	Jones (119)	Indiana S. T. C.	Indiana Comprehensive Achieve.	325	1 yr.	.85
1928	Reeves & Russell (32)	Oberlin Univ.	Sones-Harry Ach.	750	2 Q.	.59
1929	Crawford (75)	Yale Univ.	CEEB Test	591	1 yr.	.64
1930	Prosser (30)	Iowa Univ.	Qualifying Exam.	280 w.	1 sem.	.65
1931	Segal (166)	Long Beach Jr. Col.	Iowa H.S. Content	90		.23
1936	Reed (151)	Wichita Univ.	Iowa H.S. Content	400	1 sem.	.44
1936	"	Wichita Univ.	Iowa H.S. Content	400	2 sem.	.48
1936	"	Wichita Univ.	Iowa H.S. Content	400	1 yr.	.43
1937-1941	Weber (183)	Wells College	CEEB Test	59	1 yr.	.47
1937-1941	Weber (183)	Wells College	CEEB Test	48	1 yr.	.55
1937	Butsch (65)	Marquette Univ.	Iowa Content	750	1 sem.	.47
1941	Weaver (185)	Mount Holyoke	CEEB (Essay)	96	1 yr.	.57±.05
1942	"	Mount Holyoke	CEEB (Achieve.)	261	1 yr.	.52±.03
1941	Weber (184)	Wells College	CEEB Old Type		1 yr.	.46
1941	"	Wells College	Regents' Exam.		1 yr.	.51
1941	"	Wells College	CEEB New Apr. Exam.		1 yr.	.41

Total coefficients = 24
Range of coefficients = .23 to .85
Median = .49

the same examination in a given subject." (P. 72)

Crawley (79) discovered that 96 percent of the 900 freshmen making and average of 85 percent or above on the Regents' Examination entering Hamilton College in 1930-39, did satisfactory college work, while of those making below 75 percent on the Regents' Examinations, only 47.6 percent made satisfactory college marks of 70 percent or better.

Leonard and Wood's (21) Carnegie Foundation Study in 1938, of the relation of secondary and higher education in Pennsylvania, may be mentioned here, although their technique was to use achievement test scores during the students' college course as a criterion of college success, and therefore is not comparable to the present study which uses college scholarship as a criterion. They reported an average correlation of .72 between average standard scores in various high school senior tests taken in 1928 and college sophomore tests two years later. Total scores in the tests taken four years after the original tests correlated .72 with original test scores.

Butsch (65) used the Iowa High School Content Examination with 750 freshmen entering Marquette University between 1934 and 1937, and found the scores correlated .47 with first semester college grades. Borow (58) in his recent article based on former summaries, estimates that the correlation between content examinations and college grades has averaged about .50, or 13 percent better than guesswork.

Table IV shows the studies of achievement tests used in predicting college success.

This tendency for later coefficients of correlation to decrease in size could be due to the increasing numbers attending high school, the accompanying spread of abilities, and to the broadening of curricula and adoption of new methods and emphasis in teaching. It is possible that the earlier type of high school training prepared the student with factual knowledge, and that the amount of this knowledge which he attained bore a very close relationship to what he would later do on achievement tests and in college; whereas, the modern high school may develop other factors of personality effecting his college work more than specific knowledge as measured by the achievement test, and therefore render the achievement test less valid as a predictive instrument. Whatever the cause, the present study is in material agreement with later studies and places the factor of achievement tests in second place as a single predictor of college scholastic achievement. This, too, is in agreement with other studies as to the relative validity of the two factors of high school achievement and achievement tests as predictors.

But a closer analysis of Table IV and comparing it with summaries of other predictive factors will reveal that general achievement tests, including the college entrance examinations, while they are useful tools for scholastic prediction and may well be used as such, should not be used as the sole criterion for college entrance. To do this would work an unjustified discrimination against many students, since it apparently does not measure all the factors which contribute to the student's probable success in college. As will be brought out later, it is perhaps better to base selection on several instruments of prediction than to use any one as final.

B. Elementary Grade School Achievement Tests

Durflinger (88) was surpised to find a coefficient of correlation of .47 for men and .51 for women between an elementary school achievement test and college point average. This possibility should be experimented with further.

C. Achievement Tests in Specific Subject Matter Fields

Studies to determine the correlation between grades in special subject matter fields in high school and later general college achievement, faced the inevitable question of whether there is a relationship between this one factor and the criterion or whether the factor of specific high school grades is only a part of a larger factor such as intelligence, which causes the correlation.

Although the median coefficient of correlation between general achievement test scores and college grades was .49, when these achievement tests are restricted to specific subject matter fields, this median coefficient falls to .40 as shown in Table V.

Averill and Mueller (50) found that the Cross English Test, Form I, and the Inglis Test of English Vocabulary correlated .39 and .48 respectively, with first semester grades. Since the same tests correlated .39 and .54 with the Otis Advanced Intelligence Examination, the authors concluded that size of vocabulary is a better predictor of college success than knowledge of grammatical forms.

Mills (25) reported that the Language Test correlated .30 with first quarter grades of 101 girls at the University of Colorado in 1929. Cuff (80) and Nelson (137) also used reading and English tests with the latter study reporting the high correlation of .67 for the Nelson-Denny Reading Test with first year grades in college. Edds and McCall (92) got a coefficient of correlation of .44 using the Cross English Test in 1933. Segal (166) shows correlations of the subject covered in the Iowa High School Content Examination and college achievement. The interesting thing about Patterson's (143) study at the University of Minnesota was that transfer students from other colleges to the College of Education within the University, had a .376

TABLE V

STUDIES IN THE USE OF ACHIEVEMENT TESTS IN SPECIFIC SUBJECT MATTER FIELDS. IN PREDICTING GENERAL SCHOLASTIC ACHIEVEMENT IN COLLEGE

Date	Reference	Institution	Test	No.	Time	r
1925	Averill & Mueller (50)	Worcester Normal	Cross Eng.	114	1 sem.	.39
1925	Averill & Mueller (50)	Worcester Normal	Inglis Eng. Vocab.	114	1 sem.	.48
1929	Mills (25)	Colorado Univ.	Lang. Exp.	101	1 Q.	.30
1929	Cuff (80)	E. Kentucky S.T.C.	Whipple Reading	393	1 sum.	.36
1929	"	E. Kentucky S.T.C.	Monroe Silent Reading Compre.	393	1 sum.	.25
1929	"	E. Kentucky S.T.C.	Reading Rate	393	1 sum.	.10
1930	Nelson (137)	Iowa S. T. C.	Local Eng.	757	1 yr.	.54
1930	"	Iowa S. T. C.	Nelson-Denny Reading	757	1 yr.	.45
1931	"	Iowa S. T. C.	Nelson-Denny Reading	157	1 yr.	.67
1931	Segal (166)	Long Beach Jr. Col.	H.S. Content Eng.	90	2 yrs.	.35
			Mathematics	90	2 yrs.	.22
			Science	90	2 yrs.	.14
			Social Studies	90	2 yrs.	.19
1933	Edds & McCall (92)	Milligan College	Cross English Test	309	1 sem.	.44
1931-1933	Patterson (143)	Minnesota Univ.	Iowa English 1	309		.18
1931-1933	"	Minnesota Univ.	Minn. Reading 1	339		.28
1931-1933	"	Minnesota Univ.	Minn. Reading 2	339		.38
1931-1933	"	Minnesota Univ.	Minn. Reading 1 & 2	538		.36
1936	Martin (132)	Trenton S. T. C.	CEEB Tests	228	4 yrs.	
			History			.48
			Science			.42
			Mathematics			.33
			Objective Eng.			.28
			Written English			.25
			Oral English			.24
1936	Reed (151)	Wichita Univ.	Iowa Read. Comp.	400	1 sem.	.42
			Iowa Read. Rate	400	1 sem.	.16
			Purdue Placement Test in English	400	1 sem.	.41
1937-1941	Weber (183)	Wells College	CEEB Tests	59	4 yrs.	
			English			.40
			Phys. Science			.36
			Latin			.55
			History			.59
			Regents' Exam.			
			English			.48
			Physics & Chem.			.56
			Geometry			.38
			History			.44
			Algebra			.54
			French			.58

TABLE V (Continued)

Date	Reference	Institution	Test	No.	Time	r
			Latin			.70
1942	Williamson & Freeman (190)	Minnesota Univ.	Iowa English	379	1 Q.	.44
			Coop. Gen. Math.	379	1 Q.	.41
1934	"	Minnesota Univ.	Coop. Gen. Eng.	951	1 yr.	.36
1934	"	Minnesota Univ.	Coop. Contemp. Affairs	951	1 yr.	.36
1935	"	Minnesota Univ.	Coop. Gen. Math.	827	2 Q.	.38
1935	"	Minnesota Univ.	Coop. Gen. Eng.	827	2 Q.	.37
1935	"	Minnesota Univ.	Coop. Contemp. Affairs	827	2 Q.	.36
1935	"	Minnesota Univ.	Coop. World Hist.	827	2 Q.	.34
1934	"	Minnesota Univ.	Coop. Gen. Science	827	2 Q.	.25
1941	Weaver (185)	Mt. Holyoke Col.	CEEB (Essay)	96	1 yr.	
			English			.40±.06
			French	27	1 yr.	.57±.09
			Chemistry	20	1 yr.	.69±.08
			CEEB (Achieve.)			
			English	261	1 yr.	.42±.03
			French	87	1 yr.	.55±.05
1941	Votaw (182)	Southwest Texas	Coop. Chem.	31	1 yr.	.46±.09
			Coop. English	412	1 yr.	.53
1945	Smith (169)	Fresno State Col.	Iowa Reading	903	1 sem.	.44
			Iowa Reading	903	2nd sem.	.39

Total coefficients = 57
Range of coefficients = .10 to .70
Median = .40

coefficient of correlation between their Minnesota Reading Test scores and honor point ratio, while non-transfers in the College of Education had a correlation of .282 between the same factor and criterion.

Read (151) found the Iowa Silent Reading Test scores correlated .42 with first semester scholarship at Wichita Municipal University in 1936, while the "rate" scores of the same test correlated only .16 with the same criterion. Scores on the Purdue Placement Test in English correlated .41 with first semester scholarship for the same group.

Of Martin's (132) study of C E E B test scores and four-year college average, Written and Oral English produced the lowest correlations while scores in History and Science ranked the best. In this same study, "Rank in High School Class" was the best predictor while "Freshman Interviews" was one of the least effective.

Templeton (173) used a 29-word vocabulary test with 2,519 entering freshmen at the University of Illinois in 1939, to compare with scores on the objective test given, and concluded: ". . . the little 29-word vocabulary test did just as well, on the whole, as the much longer objective test, in predicting the general semester point average of all courses." (P. 215) He states, however, that he presented the investigation not to show the possibilities or the need of foretelling a student's future by a vocabulary test, but to provide new evidence to be used in impressing upon high school and college students the importance of good vocabulary.

Weber (184) studied the comparative predictive values of College Entrance Examination Board Examinations at Wells College from 1937 to 1941, and the Regents' Tests for the same time, and felt that the entrance examinations in Latin, French and the sciences are superior instruments for predicting work of subsequent academic years. But he refers to Thorndike's study of 13,000 high school students and the latter's decision that some subjects--Latin, French algebra, geometry, physical science,--select superior intellects rather than make them superior. She continues to point out that she and Thorndike both agree that there is a small but real disciplinary value in favor of certain languages and sciences in promoting powers of clearer thinking and expression which carry over into all other school subjects.

Votaw (182) included in his study of 412 freshmen at the Southwest Texas State College, in 1941, scores on the Use of Library and Study Materials Test by Kilpatrick, and found it to correlate .56 with first year grade point average. Thus, another unusual factor is found and may be found effective in future studies.

D. Summary and Conclusions

The median of the 24 coefficients of correlation reported between general achievement test scores and subsequent general scholarship in college is .49, placing this factor in second place and just below high school scholarship (including average grade or percentile rating, principal's rating, etc.,) regardless of how figured among the predictive factors studied in the present summary. This is consistent with the respect with which it has always been regarded as a college entrance requirement and as an instrument for predicting scholastic success. In 1943, Durflinger (88) in his survey of many studies of factors, compared the summaries of correlations between content examinations and college scholarship before and after 1934. (See Table VI)

The median of the present summary of 24 coefficients is .49. The median of the 13 studies up to and including 1934 is .49. The median of the 11 after 1934 is .48. Thus, the present study agrees perfectly with Durflinger's summary of studies since 1934, (.48), although the over-all median of all coefficients in the present study is six points below the average median of studies made before 1934.

Although general achievement tests rate in second place in the present summary as predictors of scholastic success with a median coefficient of .49, when these achievement tests are restricted to specific subject matter fields, the median coefficient of correlation between the scores in these specific fields or subjects and later average college scholarship in general falls to .40. This follows the observation of educational psychologists that if a person possesses unusually high aptitude in one motor or mental ability, he is likely to have superior ability in all other areas, but not necessarily to the same extent. Thus it follows that if a student shows unusual achievement in one school subject, it does not necessarily follow that he will show correspondingly good work in other fields or in scholarship in general. However, proficiency in some subject matter fields is a better prediction of scholastic success in general, than is proficiency in others. A breakdown of Table VI is given in Table VII, having the relative predictive value of each subject mentioned in this regard.

Latin was at the top with an average of .63 for two coefficients of correlation recalls the old contention that the mental discipline of Latin assures a relative achievement in college; but experimentation and study of this problem have proved beyond doubt that there are so many other factors at work in producing a good Latin student, that it is not necessarily the study of Latin which makes him a good student in college. Good students in Latin have been found to have, for instance, high intellectual ability and interest as well as other qualities conducive to good scholarship, so that it appears that potentially good students take Latin while Latin does not necessarily make good students. The same holds true for French which is rated second in the present summary. General reading tests rank third and since reading is a field more univer-

TABLE VI

MEDIAN COEFFICIENTS OF CORRELATION BETWEEN ACHIEVEMENT EXAMINATIONS AND COLLEGE SCHOLARSHIP, FROM SUMMARIES MADE BEFORE AND AFTER 1934 (AFTER DURFLINGER)

Author	Date Before 1934	Number	Median
Harl R. Douglass	1931	67	.55
David Segel	1934	13	.54
Mazie E. Wagner	1934	88	.56
			.55
	After 1934		
G. W. Durflinger	1942	20	.48

TABLE VII

THE AVERAGE COEFFICIENT OF CORRELATION BETWEEN ACHIEVEMENT TEST SCORES IN SPECIFIC SUBJECT MATTER FIELDS AND GENERAL SCHOLASTIC ACHIEVEMENT IN COLLEGE

Subject	No. r's reported	Average r
Latin	2	.63
French	4	.57
Reading (general)	8	.42
Mathematics	7	.42
Social Studies	7	.39
Science	5	.35
Reading Comprehension	2	.34
Reading Rate	2	.13

sally entered by students, there must be rather close relationship between this achievement and probable college scholarship. The same is true to less degree for mathematics which, nevertheless, ties with general reading achievement for third place. Social studies involve a great deal of reading and logically ranks next while English ranks sixth, probably because such tests involve the mastery of grammar and therefore allow for more varied achievement. Science is more or less a specialized field and offers a wide range of possibilities of achievements among individuals and could therefore be expected to be correlated less closely with the later general scholarship.

The final interesting revelation of the summary is the agreement that reading comprehension is more important to scholarship than is reading rate, although these two accomplishments rank at the bottom of the list of factors for achievement in general scholarship. Apparently, it is neither the student's ability to comprehend or his rate in reading which makes him a good student, but other factors which govern his achievement and which can be revealed only by measuring all other factors possible which could account for the difference between his ability and his achievement.

D. Summary and Conclusions

1. General achievement tests rank second as predictive instruments in the present study, with a median coefficient of correlation of .49 (or about 13% better than guess work).
2. Achievement tests in specific subjects show a median coefficient of correlation of .40 with the criterion.
3. Achievement tests in English, language, vocabulary, and use of library proved effective predictive instruments.
   a. Silent reading is more predictive than oral or written.
4. Knowledge of history and science correlates higher with college grades than oral or written English.
5. Although examination scores on languages, mathematics, and science correlate higher with the criterion than do scores on other subjects, it is not yet clear whether these subjects "draw" the more capable students or "make" them.
6. Achievement test scores continue to correlate less with college grades possibly because of the shift in emphasis in high school and preparatory school from the purely academic to general education.
7. One study showed grade school average as an acceptable predictive factor for college scholarship.
8. Achievement tests should not be used as the only basis for college admission.

SECTION IV

MEASURES OF GENERAL MENTAL ABILITY AND CAPACITY AS PREDICTORS OF COLLEGE SUCCESS

A. Intelligence Tests and Psychological Examinations

By far the most popular factor studied in its relation to college success has been intelligence, and the present summary of 94 studies using general intelligence tests or psychological examinations, gives a median of .47, placing this factor third among the predictive factors reported in educational literature. Table VIII gives this summary.

1. Comparison with Other Summaries

Table VIII shows the coefficients of correlation between intelligence test scores and college marks centering around the middle forties, with fluctuations among the reports as low as .17 and to as high as .67, but with a median of .47 and an interquartile range of only 14.59. This is in keeping with earlier summaries of Roberts (158) from .31 to .60; and McPhail (33) .13 to .71. Durflinger (91) lists other summaries in Table IX. Durflinger reported a median of .52 for 47 coefficients since 1934. Porow (58) in a late article based on summaries by others, estimated the average to be about .45, or eleven percent better than guess work. Thus the present summary showing a median coefficient of correlation of .47 is in almost perfect agreement with former summaries.

2. Validity of Test Used

The most popular tests with the studies reported in Table VIII and their average coefficients of correlation with college scholarship are: American Council on Education Psychological Examination .49, Ohio State University Psychological Examination .49, and Otis Self-Administering .48.

The A. C. E. Psychological Examination consistently gives a higher coefficient of correlation in these studies. Whether the effort to measure "differential" aptitude as well as strictly "verbal" aptitude, contributes to this success or not, is not known. However, at the beginning of the testing movement, when curricula were still heavily loaded with strictly verbal subjects, the intelligence tests also were found to test mostly this ability. Upon the enrichment of the curriculum, conscientious effort has been made to all intelligence tests to test the other mental factors as well. The present A.C.E. Psychological Examination consists of two parts. The first gives three sub-tests yielding a "Q" or "Quantative" index (completion, same-opposite, verbal

TABLE VIII

STUDIES IN THE CORRELATION OF INTELLIGENCE WITH GENERAL SCHOLASTIC SUCCESS IN COLLEGE

Date	Reference	Institution	Test	Time	r
1919	Bridges (71)	Ohio State	Army Alpha		.35
1919	DeCamp (82)	Penn. State	Army Alpha		.41
1920	DeCamp (82)	Penn. State	Army Alpha		.41
1919	DeCamp (82)	Penn. State	Thurstone IV		.32
1920	DeCamp (82)	Penn. State	Binet (Stan. Rev.)		.17
1917	Johnson (120)	Univ. of Minn.	Army Alpha		.63
1919	Louttit (128)	William Smith	Army Alpha (women)		.23
1919	Louttit (128)	Hobart College	Army Alpha (men)		.32
1918	Van Wagenen (180)	Univ. of Minn.	Army Alpha	1 sem.	.39
1918	Van Wagenen (180)	Univ. of Minn.	Army Alpha	2 yr.	.35
1919	Murray (135)	Sweet Briar	Thurstone	1 yr.	.34
1919	Murray (135)	Sweet Briar	Thurstone	2 yr.	.48
1920	Murray (135)	Sweet Briar	Thurstone	1 yr.	.42
1921	Murray (135)	Sweet Briar	Thurstone	1 yr.	.44
1919	Wood (193)	Columbia Univ.	Thorndike	1 yr.	.58
1919	Wood (193)	Columbia Univ.	Thorndike	2 yr.	.62
1920	Colvin (73)	Brown Univ.	Army Alpha	1 tr.	.44
1920	Colvin (73)	Brown Univ.	Army Alpha	1 yr.	.46
1922	Colvin (73)	Brown Univ.	Army Alpha	1 tr.	.53
1922	Colvin (73)	Brown Univ.	Thorndike	2 yr.	.53
1922	Colvin (73)	Brown Univ.	Army Alpha	2 yr.	.46
1923	Colvin (73)	Brown Univ.	Thorndike	1 yr.	.37
1921	Ellefson (93)	Milligan College	Otis Group		.50
1921	Ernst (94)	Pittsburg Univ.	Army Alpha		.33
1923	Arlitt (50)	Bryn Mawr	Stanford-Binet		.30
1923	Averill (59)	Normal School	Otis Self-Admin.		.61
1923	Binnewies (54)	S. Dakota S.T.C.	Terman Group		.49
1923	Binnewies (54)	S. Dakota S.T.C.	Miller Mental Abil.		.43
1923	Binnewies (54)	S. Dakota S.T.C.	Otis Self-Admin.		.39
1923	Root (157)	Pittsburg Univ.	Thorndike		.51
1924	Edgerton (11)	Ohio State Univ.	Ohio State Univ. Psych. Ex. (men)		.49
1924	Edgerton (11)	Ohio State Univ.	Ohio State Univ. Psych. Ex. (women)		.65
1925	Guiler (110)	Miami Univ.	Otis Self-Admin.	1 sem.	.48
1925	Guiler (110)	Miami Univ.	Otis Self-Admin.	2 sem.	.40
1925	Guiler (110)	Miami Univ.	Terman Group (both)		.49
1925	Guiler (110)	Miami Univ.	Terman Group	1 sem.	.49
1925	Guiler (110)	Miami Univ.	Terman Group	2 sem.	.48
1925	Guiler (110)	Miami Univ.	Terman Group (both)		.52
1925	Chambers (70)	Ohio State Univ.	Ohio State Interest Test		.33
1926	Bolenbaugh & Proctor (57)	Standford Univ.	Thorndike		.45
1926	Bolenbaugh & Proctor (57)	Standford Univ.	Thorndike		.37
1926	Condit (74)	Colorado S.T.C.	Thurstone		.41
1926	Condit (74)	Colorado S.T.C.	Thurstone		.45
1927	Cleeton (8)	Carnegie I. T.	Thorndike		.50
1927	Jones (123)	Indiana S.T.C.	Detroit Interest Test		.55
1927	Pierson & Nettels (146)	"Colleges"	Terman Group		.43

TABLE VIII (Continued)

Date	Reference	Institution	Test	Time	r
1927	Whitney (187)	Colorado S.T.C.	Thurstone		.48
1928	Schultz (33)	Penn. Univ. Col. of Education	Terman Group		.34
1928	Harston (16)	Oberlin College	Ohio State Univ. Psych. Exam.(men)		.62
1928	Harston (16)	Oberlin College	Ohio State Univ. Psy. Exam. (wom'n)		.58
1928	Harston (16)	Oberlin College	A.C.E. Psych. (men)		.53
1928	Harston (16)	Oberlin College	A.C.E. Psych.(wom'n)		.50
1929	Byrns (66)	Michigan Univ.	Ohio State Univ. Psych. Exam.	1 sem.	.36
1929	Byrns (66)	Michigan Univ.	Ohio State Univ. Psych. Exam.	1 sem.	.48
			Ohio State Univ. Psych. Exam.		.43
1929	Cuff (80)	Kentucky S.T.C.	Miller Mental Abil.		.46
1929	Drake (85)	Adelphi Women's College	A.C.E. Psych.		.51
			"		.40
			"		.49
			"		.40
			"		.45
1929	Gerberich (104)	Arkansas Univ.	A.C.E. Psych.		.46
1930	Gerberich (104)	Arkansas Univ.	"		.58
1931	Gerberich (104)	Arkansas Univ.	"		.55
1930	Fritz (102)	Pittsburg. Kans., S.T.C.	A.C.E. Psych.		.53
1930	Guiler (105)	Northwestern	Army Alpha		.43
1931	Segal (166)	Long Beach Jr. College	Thurstone		.48
1931	Douglass (83)	Oregon Univ.	A.C.E. Psych. (men & women)		.45
			A.C.E. Psych. (men)		.42
			A.C.E. Psych. (women)		.49
1932	Harston (112)	Oberlin College	Ohio State Psy. Exam.		.55
1931	Nelson (137)	Iowa S. T. C.	A. C. E. Psych.		.67
1932	Fleming (98)	"Colleges"	Thorndike		.37
1935	Fleming (98)	"Colleges"	A. C. E. Psych.	2 yrs.	.50
1935	Fleming (98)	"Colleges"	A. C. E. Psych. (men)	1 yr.	.46
1935	Fleming (98)	"Colleges"	A. C. E. Psych. (women)	1 yr.	.56
1935	Fleming (98)	"Colleges"	Ohio State Psy. Exam.	2 yr.	.46
1935	Fleming (98)	"Colleges"	Ohio State Psy. Exam. (men)	1 yr.	.41
1935	Fleming (98)	"Colleges"	Ohio State Psy. Exam. (Women)	1 yr.	.54
1933	Edds & McCall (92)	Milligan College	Otis Group		.50
1934	Douglass & Lovegren (84)	Minnesota Univ.	A. C. E. Psych.		.50

TABLE VIII (Continued)

Date	Reference	Institution	Test	Time	r
1934	Finch & Nemzek (96)	Minnesota Univ.	Battery: Army Alpha Haggerty, Delta Pressey Senior Class, Terman Miller Mental Ability		.42
1936	Read (151)	Wichita Univ.	Ohio State Psy. Exam.		.42
1937	Butsch (65)	Marquette Univ.	A. C. E. Psych.		.53
1939	Prescott & Garrettson (148)	Phoenix Jr. Col.	Otis Self-Admin.		.21
1939	Prescott & Garrettson (148)	Arizona Univ.	Carnegie M. A.		.42
1939	Dubois (87)	New Mexico Univ.	A. C. E. Psych.		.44±.03
1940	Attender (47)	Patterson, N.J. S. T. C.	Henmon-Nelson		.35±.03
1940	Garrett (103)	52 Colleges	Ohio State Psy. Exam.		.61±.03
1941	Votaw (182)	Southwestern Texas S. C.	A. C. E. Psy.		.53
1944	Weber (184)	Wells College	A. C. E. Psy.		.45
1945	Smith (169)	Fresno State Col.	A. C. E. Psy.	1 sem.	.42
1945	Smith (169)	Fresno State Col.	A. C. E. Psy.	2 sem.	.38
1947	Bent (52)	Arkansas Univ.	Quartile Rank on Otis Self-Admin. or Thurstone Psy.		.63

Number of coefficients = 94
Range of coefficients = .17 to .67
Interquartile range = 14.59
Median = .47
S. D. = .24
A. D. = .12

TABLE IX

SUMMARY AVERAGES OF COEFFICIENTS OF CORRELATION REPORTED BETWEEN INTELLIGENCE TESTS AND COLLEGE GRADES (AFTER DURFLINGER)

Author	Date	No. of Coefficients	Mean	Median
Harl R. Douglass	1931	160	.44	.45
L. B. Kinney	1932	442	.45	
David Segal	1934	100		.44
Mazie E. Wagner	1934	39		(.40 to .50)

Average figure (whether mean or median) .45

analogies, and number series), and the second part has three sub-tests yielding "L" or Linguistic" index (completion, same-opposite, and verbal analogies). The whole test thereby reveals the "differential" aptitude as well as the "verbal" and in this way can predict better the probable achievement of a student in the wide range of courses and fields which he will take in college requiring the different kinds of mental ability. Other tests use a similar technique but apparently not as successfully, since higher correlations are reported with the use of the A. C. E. examination.

3. Reliability of Tests Used

Here may be raised the question of whether or not the scores from one intelligence test are as predictive of scholastic success in one college as in another. Students coming from every section of the country to a given college may have their performance on a common intelligence test reported in various ways, e.g., as raw score, derived score, I.Q., or percentile score. There is need for a unified program of equivalent score reporting before scores reported by one institution will have an equivalent significance in all schools. To be sure, when the same test is used for prediction each year, a given score comes to have definite predictive value as to probabilities of academic success in that institution. But it is sometimes difficult to assume that these same scores will have comparable predictive value in other institutions, both because of the differences in ways of reporting scores, and in the type of student attending the other institution.

B. Other Measures of Mental Ability

In the present summary, all tests of mental ability other than general intelligence tests or psychological examination, are considered separately, and presented in Table X.

Among the most popular of the general aptitude tests other than intelligence tests and psychological examinations are the Yale Classification Test, Minnesota College Aptitude Test, College Entrance Examination Board Tests, and the Stanford Aptitude Tests.

As seen in Table X, the median coefficient of correlation between scores on these and similar tests and college scholarships in general is .43 for the 28 coefficients reports. Coefficients range from .12 to .56. For the 15 cases when the criterion was general scholarship for one semester or one quarter, the median coefficient was .41; when the criterion was scholarship for one year, the median was .415 among the eight coefficients. The only study reporting 2-year scholarship as a criterion showed a coefficient of correlation of .44 between it and the predictive factor. The four studies with a 4-year college average as the criterion showed a median coefficient of correlation of .395 with their other factors regardless of the extremely low one of .12 which Fricken (101) found to exist between the Minnesota College Aptitude Test and the 4-year average of 53 men and women at Macalester College in 1928.

This would indicate that general aptitude tests are more accurate on long range predictions than when short periods of achievement are used as a criterion. The one exception above is no doubt due to the small number of cases involved. Another exception appeared when Anderson and Spencer (42) found decreasing coefficients of correlation to exist between first year averages and each succeeding year's average, and explained this as being due to inaccuracies of grading, or to variability of student performance due to variation of effort or distraction influences or to prudent selection of courses. Another possibility lies in the direct relationship between size of coefficient of correlation and the degree of spread in the other variable.

The six investigators reporting findings for women and men show a median coefficient of correlation of .51 for women's scores with their criterion, while the median of the eight accompanying reports for men was only .41. All six of these studies were consistent in showing women's scores on aptitude tests to be correlated more closely with their later scholarship than was that of the men students. This is in keeping with other reports in the present summary on the performance of men and women on other instruments of measurement and the resultant correlation of these scores with other criteria of achievement, thus indicating that the college scholarship of women can be more closely predicted than can that of men.

In general, general aptitude tests other than intelligence tests or psychological examinations, are useful means of predicting scholastic success as a whole, but according to the present summary of studies, ranks fourth with high school rank or average, general achievement tests, and intelligence tests ranking above it.

C. Summary and Conclusions

Since the number of studies reported were too numerous to treat separately in the present review, a summary of general conclusions appearing from a study of the reports, is given below:

GENERAL INTELLIGENCE TESTS AND PSYCHOLOGICAL EXAMINATIONS

1. A summary of 94 coefficients of correlation between intelligence and college grade average .46, a median of .47, and interquartile range of 14.59. This agrees closely with summaries previously reported.
2. It is estimated that the country-wide median correlation between this factor and the criterion is .45, or about 11% better than pure guess work.

TABLE X

RELATION BETWEEN GENERAL COLLEGE AND APTITUDE TESTS AND SCHOLASTIC ACHIEVEMENT IN COLLEGE

Date	Reference	Institution	Test	No. of Subjects	Time	r
1923	Anderson & Spencer (42)	Yale Univ.	Yale Classific.			
			Class of '23	402	4 yrs.	.38
			Class of '24	321	4 yrs.	.45
			Class of '25	478	4 yrs.	.43
1926	Williamson (189)	Minnesota Univ.	Minn. College			
			Aptitude	163 m.	1 qtr.	.48
			Aptitude	106 w.	1 qtr.	.54
1928	Fricken (101)	Macalester Col.	Minnesota			
			Aptitude	80 m.	1 sem.	.33
			Aptitude	49 w.	1 sem.	.56
			Aptitude	68 m.	1 yr.	.29
			Aptitude	42 w.	1 yr.	.53
			Aptitude	53 m. & w.	4 yrs.	.12
1928	Fricken (101)	Macalester Col.	Minnesota			
			Aptitude	57 m.	1 sem.	.39
			Aptitude	55 w.	1 sem.	.33
			Aptitude	109 m. & w.	1 sem.	.35
1929	Crawford (75)	Yale Univ.	CEEB Apt.	591 m.	1 yr.	.41
1933	Williamson & Freeman (190)	Minnesota Univ.	Minnesota Col. Apt. Form A.M.	379	1 qtr.	.25
1933	Wrenn & Crandall (193)	Stanford Univ.	Stanford College			
			Aptitude	345 m.		.43
			Aptitude	193 w.		.45
1934	Williamson & Freeman	Minnesota Univ.	Minn. College			
			Apt. Form 1926	658	1 qtr.	.38
			Apt. Form 1926	293	1 qtr.	.41
			Apt. Form 1926	827	2 yrs.	.44
			Apt. Form 1926	454 m.	1 yr.	.40
			Apt. Form 1926	373 w.	1 yr.	.50
1934	Douglass and Lovegren (84)	Minnesota Univ.	Minn. College Apt. Test Percentile Rank	190	1 yr.	.41
1934	Finch & Nemzek (96)	Minnesota Univ.	Minn. College Apt. Test	118	1 yr.	.42
1934	"	Minnesota Univ.	Apt. Test	90	1 yr.	.40
1939	Durflinger (88)	Nebraska S.T.C.	Local College			
			Apt. Test	108 m.	1 sem.	.41
			Apt. Test	218 w.	1 sem.	.51
			Apt. Test	total	1 sem.	.48

Total coefficients	= 28
Range of coefficients	= .12 to .56
Mean	= .42
Median	= .43
S. D.	= .13

3. The A.C.E. Psychological Examination scores correlated consistently higher with the criterion than did those of other tests, probably due to successful effort to measure both differential as well as verbal mental abilities.
4. Intelligence test scores of students coming to a given college or university from one source tend to correlate higher with college grades than do the scores of students coming from a wide selection of secondary schools, probably because of the variety of ways in which the intelligence scores are given. Also students coming from a secondary school in connection with the college or university which they are attending, have a higher correlation between intelligence and the criterion, doubtless due to the college instructors' previous knowledge of the students' records, and the uniformity of assembling data for the correlation.
5. There is a closer correlation between intelligence test scores and later college grades for those scoring high in intelligence, than for those scoring average or low in intelligence. This would indicate that students with high intelligence tend to succeed in college in spite of all other factors operating. With students of lesser mental ability, however, some may put other factors into operation to bring them scholastic success, and some may not. This uncertainty makes it more difficult to predict scholastic success in college for this group.
6. Intelligence tests test something entirely different from that tested by emotional tests, and correlate either negatively or approximately zero with them.
7. For students motivated by similar goals, there is a closer correlation between intelligence and college scholarship.
8. Intelligence test scores correlate highly with achievement test scores showing the natural relationship between one's ability to learn and one's accomplishment.
9. Intelligence test scores tend to correlate closer with college grades among some major department students in college than in other departments. In general, for those majoring in highly specialized professions the correlations are closer than for those in the general college.
10. Studies show that selective influences in general tend to send to college the high school graduate who is in the top quarter of intelligence scores.
11. Intelligence of students of low neurosis correlates more closely with college grades than that of students of high neurosis. The same is true for those with high self-sufficiency and dominance, as compared with the low ones in these groups.
12. Higher coefficients of correlation are obtained by equating several intelligence test I.Q.'s from several tests and finding the coefficient of correlation between the results and college honor points.
13. Intelligence tests taken as early as the fourth grade of elementary school predict college success practically as well as intelligence tests taken in the last year of high school.
14. Intelligence tests rank a close third as a means of predicting college success, according to the averages in the present summary.

GENERAL APTITUDE TESTS

1. A summary of 28 coefficients of correlation between scores on general aptitude tests and the criterion, show a median coefficient of .43 placing this instrument in fourth place as a predictor of college scholarship.
2. Several aptitude tests correlate more highly with college scholarship when long periods of college work are used as a criterion than where short periods are used.
3. Women's scores correlate more highly with the criterion than do those of men. This being generally true with other forms of measurement, it would appear that college scholarship for women can be more accurately predicted than can that of men.

SECTION V

SPECIAL APTITUDE TESTS AS BASES FOR THE PREDICTION OF ACHIEVEMENT IN COLLEGE

A. Tests Used

The earnest endeavor to find an instrument which will reveal a student's innate ability in a specific area and the relationship of this ability to his probable achievement in college, has resulted in the studies reported in Table XI. The coefficients of correlation range from -.04 to .65 with a median of .41 to place this process fifth among the present summary of techniques. Rather unusual among these was the Aptitude Test for High School and Elementary School Teachers (102) which yielded a .63 coefficient of correlation with the college scholarship of women; and the Wesley College Test in Social Terms which Douglass and Lovegren (84) found to be the best predictor of scholastic success in college. Combining the latter with the A.C.E. Psychological Examination raised the coefficient only to .661, showing that they apparently measure the same thing. Unfortunately, no other reports could be found of the use of this or similar tests, and the possibilities of such research should make an interesting study.

Perhaps the latest study involving aptitude tests is taken from an unpublished compilation of studies entitled "Summary of Validity Studies of the College Entrance Examination Board Tests in Current Use." (34) This compilation

TABLE XI

STUDIES IN THE USE OF SPECIAL APTITUDE TESTS IN PREDICTING GENERAL SCHOLASTIC ACHIEVEMENT

Date	Reference	Institution	Test	No. of Subjects	Time	r
1929	Cuff (80)	Kentucky S. T. C.	Pyle's Symbol Digit	393	Sum.	.37
1929	Crawford (75)	Yale Univ.	CEEB School Aptitude	591	1 yr.	.41
1929	Fritz (102)	Pittsburg, Kans., S. T. C.	Apt. for H. S. & Elem. Teacher	100 w.	Sum.	.63
1934	Douglass & Lovegren (84)	Minnesota Univ.	Voc. Test for Clerical Work I	190	1 yr.	.04
			Clerical Work II	190	1 yr.	.05
1934	"	Minnesota Univ.	Wesley College Test in Soc. Terms. A.	190	1 yr.	.65
1933	Patterson (143)	Minnesota Univ. College of Ed.	College Apt. Tests Eng. Vocabulary	538	1 sem.	.25
1939	Prescott & Garrettson (148)	Arizona Univ.	College Apt. Test	153	1 sem.	.49
1939	Prescott & Garrettson (148)	Phoenix Jr. Col.	English Aptitude	104	1 sem.	.40
1944	Shimberg (34)	Various Colls.	CEEB Tests			
			S.A.T. Verbal	3441	1 term	.43
			S.A.T. Verbal	1537	1 term	.45
			S.A.T. Math	2953	1 term	.39
			S.A.T. Math	1537	1 term	.58
			Spatial Relation	2600		.23
			Spatial Relation	1537		.32

Total coefficients = 15
Range of coefficients = -.04 to .65
Median = .41

was prepared by Benjamin Shimberg of the College Entrance Examination Board for the use of members of the staff. It includes studies made by A. B. Crawford, Henry S. Dyer, of Harvard, and others. Upon request, permission was given by Mr. Henry Chauncey, Director of the College Entrance Examination Board, to include data from this summary in the present study. For the 3441 students in various colleges studied, their scores on the Special Aptitude Test, Verbal, correlated .43 with the first term grades; and for another group of 1537 their SAT Verbal scores correlated .45 with the same criterion. SAT Mathematics scores for a group of 2953 correlated .39 with first term average; and those for the other group of 1537 correlated .58 with the criterion. Scores on the Spatial Relations Test by 2600 students correlated .23 with first term average, and those of the 1537 group gave a coefficient of correlation of .32 with this criterion. These findings are in line with other studies made earlier in the use of aptitude testing.

B. Summary and Conclusions

1. The median of the fifteen coefficients of correlation between special aptitudes and the criterion is .41, placing the instrument fifth in the present study of prediction of college scholarship.
2. The Wesley College Test in Social Terms and the Aptitude Test for High School and Elementary School Teachers proved to be among the most effective predictor of college success.
3. College Entrance Examination Board Special Verbal Aptitude Tests correlates in the middle forties with the criterion, and the SAT mathematics scores correlated .39 and .58 with first term averages for two groups. The Spatial Relations Test correlated .23 and .32 with term averages for the two groups.
4. Special Aptitude Tests have demonstrated their validity as predictors of college success and may well receive increased attention as a predictive instrument.

SECTION VI

OTHER FACTORS AND THEIR RELATION TO COLLEGE SUCCESS

A. Character and Personality

Progress is being made in developing tests of personality and character, but studies to date fail to show any consistent relationship between their scores and academic success in college. Following Chambers' (70) success in finding a correlation of .54 between Pressey X-O scores and college success at Ohio University in 1925, reports of successive studies elsewhere have yielded no such promising results. Flemming (97) got only .07 as a coefficient of correlation with the same test the same year at Columbia University, and got mostly negative correlations with the test parts at a small college in 1929. Gilliland (105) found a -.02 correlation at Northwestern in 1930. The average coefficients of correlation reported by these and other studies with recognized tests in the field are listed in Table XII.

From Table XII it would appear that the factors of personality and character other than intelligence measured by these tests, are equally distributed among the successful and the unsuccessful in college scholarship.

1. Rating Scales

However, an instrument which does apparently hold promise as a predictor of college success is the rating scale. Hartson (112) found that ratings on intelligence, industry, attitude toward school work and use of spare time, by principal, teacher, and friend, correlated with later grades .268 for women and .352 for men. Prescott and Garretson (148) reported that teachers' ratings on a 14 item scale, correlated .62 with college success at Phoenix Junior College and .64 at Arizona University. Pierson (145) used a 10-teacher rating of each student and it correlated .33 with college scholarship. Wrenn and Crandall (193) also found positive relationships between college work and decile ratings on a rating scale including: (1) appearance and manners, (2) works without prodding, (3) leadership, (4) emotional control, and (5) definite program. "Definite Program" showed the closest relationship to college scholarship, and "Appearance and Manner" the lowest. That the rating scale technique deserves further investigation is indicated by these studies, especially when high school teachers and principals rate students on such characteristics as ability to budget time, studiousness, persistence, and emotional control. These possibilities grow more promising as one observes that high school record correlates highest with college scholarship in the present summary, and high school grades are, to a degree, a reflection of the opinion teachers have of their pupils.

B. Size of High School

Size of high school from which students graduate apparently has no effect on their college grades. Somers (35) reported a coefficient of .09 between this factor and the criterion. Douglass (83) found a similar relationship of .04; Thornburg (38) reported a higher correlation for students from high schools of more than 100 enrollment than from smaller high schools. Feder (95) found higher scores on freshmen qualifying tests by the former group, also. This raises the question of whether teachers of larger high schools less likely to give favored grades to students or whether the difference is caused by the superior advantages of broader curriculum, equipment,

TABLE XII

CHARACTER, PERSONALITY AND COLLEGE SUCCESS

Date	Reference	Institution	Test	r
1925	Chambers (70)	Ohio Univ.	Pressey X-O	.54
1925	Flemming (97)	Columbia Univ.	Woodworth Personal Data	.03
1925	Flemming (97)	Columbia Univ.	Pressey X-O	.07
1925	Flemming (97)	Columbia Univ.	"Dif. Score" of X-O	-.01
1925	Flemming (97)	Columbia Univ.	Laird's Pers. Inv. B_2	.11
1925	Flemming (97)	Columbia Univ.	Woodworth Personal Data	.02
1925	Flemming (97)	Columbia Univ.	Pressey X-O	.10
1925	Flemming (97)	Columbia Univ.	"Dif. Score" of X-O	-.07
1925	Flemming (97)	Columbia Univ.	Laird's Pers. Inv. B_2	.06
1926	Williamson (189)	Minnesota Univ.	Personal History Data	.08
1926	Williamson (189)	Minnesota Univ.	Personal History Data	.05
1929	Flemming (97)	"Small College"	Pressey X-O "emotional intensity"	-.12
			"emotional variability	-.10
			"emotional deviation"	-.16
			"emotional reliability"	-.29
			"pleasantness"	.10
			"steadiness"	-.30
			"expressiveness"	.11
			"adjustment"	.02
			Colgate C_2 "introversion-extroversion"	.26
1929	Harston (112)	Oberlin College	3-judge estimate of college success:	
			intelligence	.30
			industry	.24
			attitude toward work	.26
			use of leisure time	.17
			Total of 4 above items (women)	.27
			Total of 4 above items (men)	.35
1939	Prescott and Garrettson (148)	Phoenix Jr. Col.	Teachers' Ratings on 14 character pts.	.62
1939	Prescott and Garrettson (148)	Arizona Univ.	Teachers' Ratings on 14 character pts.	.64
1930	Gilliland (105)	Northwestern Univ.	Pressey X-O	-.02
			Colgate M. H. Form C_2	.06
			Colgate M. H. Form B	-.10
1927	Pierson (145)	"Colleges"	10 teacher ratings	.33
1933	Stagner (170)	Gustavus Adolph.	X-O "Affectivity"	-.05
			A.P.C. Questionnaire	-.08
			Allport A-S (decile)	-.11
			Laird C_2	.25
			Keymann-Kohlstedt	-.12

TABLE XII (Continued)

Date	Reference	Institution	Test	r
			Moss Social Intelligence	.37
			Bernreuter Pers. Inventory:	
			neurosis (men)	.07
			neurosis (women)	-.13
			self-sufficiency (men)	.07
			self-sufficiency (women)	.14
			introversion (men)	.07
			dominance (women)	.07
			dominance (men)	-.06
1933	Wrenn & Crandall (193)	Stanford Univ.	Decile on Rating Scale	
			appearance & manner (men)	.00
			appearance & manner (women)	.09
			works without prodding (men)	.31
			works without prodding (women)	.32
			leadership (men)	.09
			leadership (women)	.24
			emotional control (men)	.20
			emotional control (women)	.28
			definite program (men)	.35
1939	Durflinger (88)	Nebraska S.T.C.	Bernreuter Pers. Inventory (women)	-.17
			Bernreuter Pers. Inventory (men)	.04
			Bernreuter Pers. Inventory (total)	-.06
1945	Salman (194)	Michigan Univ	Jr. Div. of Bernreuter Pers. Inventory:	
			B_1 -N	-.02
			B_2 -S	.03
			B_3 -I	-.01
			B_4 -D	.02
			F1 -C	.01
			F2 -S	.03
		Total coefficients	63	
		Range of coefficients	-.30 to .64	
		Median	.09	

and more activities in the larger schools.

Stalnaker and Remmers (90) found a .21 relationship between size of high school and dropouts of Purdue University. Boe (3) Jones (123), and Alexander and Woodruff (43) report finding no correlation between size of school and the criterion. Dwyer (90) in his summary of such studies in 1938, concluded that results were quite uniform with very little relationship reported.

C. Interest

A locally developed "interest" test at Adelphi Womens College was reported by Drake (85) to correlate from -.24 to -.06 with freshmen grades Odell (139) reported a .53 correlation between freshmen marks and Otis Test for Illinois High School graduates entering college with Pharmacy as their vocational choice, and .19 for those choosing athletic coaching as a vocation. Common interests and goals found among students preparing for certain of the professions such as teaching, law, and medicine, have been found to affect favorably the correlation of these students' abilities with their actual achievement, while general courses do not seem to inspire this uniform performance.

D. Physical Factors

Weight and height correlated .00 and .01 with first semester college grades as reported by Harris (111). Flory (99) took x-rays of 95 freshmen at Lawrence College in 1938-39 and concluded that "older mature students, even when somewhat less intelligent, are likely to exceed immature students in achievement."

E. Age and College Success

It has long been the general belief that accelerated students or students who enter college earlier than the average age, do better academically than the average student. This was normally reasoned to be because of the students' superior intellectual ability which caused them to finish preparatory school earlier before entering college and that this same superiority again showed up in college. There have always been grave doubts, however, about the advisability of permitting this acceleration because of the possible frustration the student may face in being forced to associate with youth of a different age and stage of physical and social development. This problem has resulted in many investigations and reports, both objective and subjective, most of which show remarkable agreement in substantiating the assumed superiority of younger college students scholastically, although the degree of this superiority and the effect upon the student in other ways, has varied somewhat among the reports.

Pittenger (147) in 1910, reported 18 years as the model college entrance age, with those entering younger doing slightly better work, but those entering when older doing less well at first, then tending to reach the others during the last two years of college work. Holmes (118) reported that Harvard got " better results with less friction from younger men than from older". James (119) said 15-year-olds made the highest grades at Columbia College with grades becoming poorer as entering age increased. Whinery (186) reported that of freshmen taking the Ohio State University Psychological Examination, the highest five percent averaged one year and four months younger than the lowest five percent. Thornburg (38) found a decided drop in scholarship for those entering after the age of 19. Kaulfers (124) summarized nine studies and found a median of -.24 for the correlation between age and college grades. Pressey (149) reported the following concerning accelerates in college:

> In short, the accelerates are a little younger than the other students, a little more able, better in scholarship, and as well adjusted socially . . . . The "super-accelerates" do well academically and reasonably well in activities. In all respects, it is the retards who present problems. (P. 569)

Dr. Pressey strongly urges that better methods be found by which superior students may move more easily through an educational program faster than the average pace.

Keys (125) found the scholarship of under age sophomores at the University of California to be one-fourth of a grade point better than the average sophomore. However, 17% of the under-age group regarded their "mental health and emotional adjustments" as unsatisfactory, as compared with only 8% of another group unmatched for intelligence.

These studies and others are listed in Table XIII which reveals an average coefficient of correlation of -.11.

F. Types of Curriculum Content

While the Eight Year Study was so broad in its scope and covered in detail such ramifications of factors in all types of colleges and universities that the findings are not pertinent to the present summary except in general as a basis of comparison and for its implications in the light of changing curricula in secondary schools and its resultant effect on college entrance requirements. The authors (7) report:

> The graduates of the thirty schools earned grades which were, contrary to some predictions, slightly but consistently higher than those for the comparison group. The margins of difference are regularly small but at the same time cannot reasonably be attributed to chance alone. More significant than

TABLE XIII

THE RELATIONSHIP BETWEEN AGE AND SCHOLASTIC SUCCESS IN LIBERAL ARTS AND TEACHERS COLLEGE

Year	Reference	College	Predictive Instrument	No.	Specific Crit'n Var.	r
1921	Ellefson (93)	Univ. of California	Age	134	1st sem. ave.	-.31
1923	Wilson (191)	Univ. of Oklahoma	Age	250	1st yr. ave.	-.03
1924	Odell (139)	Univ. of Illinois	Age	2000	1st.yr.	-.23
1924	Somers (35)	Columbia Univ.	Age	212	1st & 2nd yrs.	.05
1926	Manson (23)	Univ. of Michigan	Age		1st sem.	-.11
					2nd sem.	-.08
1927	Jones (122)	Indiana S.T.C.	Age	325	Fall term	.06
1927	"	Indiana S.T.C.	Age	325	1st yr.	-.11
1928	Dwyer (89)	Univ. of Michigan	Age	567	1st sem. ave. men	-.25
1928	"	Univ. of Michigan	Age	303	1st sem. ave. wo'n	.05
1929	Crawford (15)	Yale Univ	Age	591	1st yr. men	-.37
1931	Drake (85)	Adelphi Women's College	Age	140	Fr. aver.	-.27
1933	Patterson (143)	Univ. of Minnesota	Age	309	Honor pt. ratio	.03
1933	"	Univ. of Minnesota	Age	229	Honor pt. ratio	.10

Number of coefficients = 14
Range of coefficients = -.37 to .06
Median = -.095

> the small margin of superiority is a sound demonstration that students having a-typical high school programs do at least as well in college in terms of grades as do the graduates from schools whose programs automatically guarantee the accumulation of the proper number of units or examination points. (P. 24-25)

Hence, this experiment indicates that students from schools attempting to find new ways of teaching and new content for curriculum are at least not handicapped in present day colleges and universities. This encouraging fact fits in well with the current interest in the Life Adjustment Program, and stimulates continued experimentation and research in an attempt to develop curricula in both secondary and higher education which will best prepare students for the age in which they live.

G. College Scholarship of the Returned Veteran

Most of the studies report veterans doing above average work in college. Kvaraceus and Baker (126) found that they did better than non-vets in an educational measurements course final examination. Atkinson and Webb (48) reported that the 100 Public Law 16 rehabilitation veterans in the University of California at Los Angeles attained an over-all average of 1.536 (on standard scale of C equals 1 unit) and that 23 percent made "B" or better.

President Day (81) of Cornell University reported in February, 1947, that ". . . . veterans are doing even better work than the average college student and not 'taking a ride on Uncle Sam's generosity'." Thompson and Fletcher (175) reported a .15 point hour ratio superiority for veterans during the winter quarter of 1946 at Ohio State University.

H. Others

Thisted (174) used the Personal Information Blank at the University of Iowa in 1928 and found that the various factors correlated with first semester grade point as follows: individual items from .39 to -.27; total scores on all items .34, family-home data .28; personal activities .25; and author's prognosis of academic success, .44.

Harris (111) reported the following conclusions in his study of various factors and their relation to college grades: (1) Extroverts make better marks than introverts; (2) those with no handicaps do a little better than those with three handicaps; (3) those preferring sophisticated, controversial, radical, and non-current-events periodicals did slightly worse than those preferring current events, non-sophiscated, non-controversial and non-radical matter; (4) those preferring sophisticated literature did worse than those preferring religious materials; (5) those preferring mathematics, modern language and science in high school made better grades than those who disliked these subjects; (6) those who liked English, drawing, music and physical training in high school made worse grades in college than those who disliked these subjects; (7) those who chose law, medicine, business, accounting, engineering, dentistry, and literature as vocations made worse college grades than those who chose to be teachers: only those choosing science as a vocation made slightly better grades than those choosing teaching; (8) those with unskilled fathers did very little worse than those whose fathers were in the professions; (9) foreign born students did better than those whose parents were both born in the United States; (10) those with widowed mothers made better grades than those of the main group; (11) students with no brothers and sisters did worse than those with five brothers and sisters; (12) those who had only one brother or sister did much better than those with five brothers and sisters; (13) those with four brothers and sisters did slightly better than those with five brothers and sisters; (14) those whose brother or sister had had college experience did slightly worse than the main group; and (15) those who believe in God did better than those who did not believe in God.

Feder (95) studied somewhat different factors and reported that, in his study: (1) students from parochial secondary schools were poorest in ability and achievement; (2) prediction coefficients were consistently lower for out-of-state students and graduates of larger high schools; (3) students entering directly from secondary schools seemed to have the best preparation for college; (4) those out of secondary school one-half to two years before entering college showed poorest achievement in the first year of college and those out two and one-half years or more, achieved grade averages noticeably better than predicted.

Read (47) got somewhat different results, and conclusions: ". . . . . In other words, there is no evidence that one or more years intervening between high school and college had any effect upon the scholastic records of these freshmen." (P. 385)

Alexander and Woodruff (43) in their study said:

> The fact of supervision of study halls in secondary schools, the time spent in high school organizations and activities, the amount of employment in high school, and the hours spent in high school in class preparation, do not appear to determine a student's rank in college. (P. 482)

These findings are challenging and deserve further research in an effort to find the factor or combination of factors which consistently have the closest relationship to college scholarship.

Held (113) found no statistically reliable difference in scholarship and intelligence between NYA students and others. Shaffner (168) reported those employed six to twenty-one hours per week ranked highest in scholarship, those working twenty-four or more hours per week ranked second, and the non-workers ranked lowest.

Nemzek (138) reported in 1940 that chronological age at the time of entering elementary school, extent of the education of father and mother, and occupational status of father had a negligible value in predicting academic success in his study.

I. Summary and Conclusions

Although admirable progress has been made in discovering and attempting to measure the factors which contribute to scholastic success in college, all writers agree that there remains a unique, unmeasurable factor, or perhaps many factors, lost in the unpredictable intricacies of human personality. However, some of the more accepted conclusions which have come from repeated studies, include:

1. Tests of personality in general show practically no correlation with college grades.
2. The rating scale has in several instances, been reported as a promising instrument although there have been relatively few studies of this technique.
3. Very little, if any, relationship exists between size of high school and college scholarship.
4. Common interests or goals among students in courses preparing for certain professions appear to result in a higher correlation between their abilities and their achievement, than is true of students in general courses.
5. There is no correlation apparent between physical factors and college achievement.
6. Eighteen is the model age at which to enter college. Those who enter younger tend to do better work than those entering later, apparently because their superior mental ability has permitted them to finish secondary school earlier.
   a. Unsatisfactory social and emotional adjustment among accelerates in college is evident to some degree, but is not as much a problem as in secondary school.
7. Graduates of the thirty schools of the Eight Year Study with their modern course of studies, content, and organization did slightly better in college than those of the comparison group.
8. Returned veterans of World War II are consistently reported to be doing better work in college than the average college student.

Various other factors reported in single studies listed under Section H above, have apparently no relation to college scholarship, while others indicate some correlation with the criterion, and may well be investigated in future research.

SECTION VII

COMBINATIONS OF BASES IN PREDICTING COLLEGE SUCCESS

A. Two-Variable Combinations

Multiple coefficients of correlation were computed by many of the authors to discover the extent to which a combination of predictive factors improved the correlation with the criterion over that given by a single factor. The greater number of those reported were two-factor combinations. In order to present the more successful studies made, Table XIV is presented, showing, in descending size, the two-variable multiple coefficients of correlation reported.

Because intelligence is one of the best predictors of college success among the zero-order coefficients of correlation, this factor is one of the most popular to be found in the two-factor combinations in Table XIV. In this table, adding high school marks to intelligence raised the latter's coefficient of correlation with the criterion an average of .157 points; while adding intelligence to high school record improved the high school record correlation with the criterion an average of only .09 points. Thus, high school average remains the best predictor of college grades.

The median zero-order coefficient of correlation between intelligence and college success was found in the present summary to be .47, and for high school grade average the median is .56, while the median multiple coefficient of correlation obtained by the twenty combinations of these two factors is .62, indicating the usefulness of this technique in predicting college success.

Notable among the other combinations presented in Table XIV was that reported by Cuff (80) who found that vocabulary test scores added to the Miller Mental Aptitude Test scores raised the coefficient of correlation of the latter with the criteria .08. Douglass and Lovegren (84) found that adding the Wesley Test of Social Terms increased the intelligence coefficient of correlation between intelligence and college grades, .165 points.

In other studies not shown in Table XIV, Drake (85) found that interest tests either added nothing or decreased the coefficients of correlation when added to intelligence, while Flemming (98) and Gilliland (105) agreed on the small extent to which the addition of personality test scores improves intelligence as a predictor.

B. Three-or-more Factors in Combination

Very few writers have reported three or more variables in combination. Douglass (83) after his extensive study of this technique, says:

> Employing a third variable adds but little to the predictive merit of the above two vari-

TABLE XIV

TWO-VARIABLE MULTIPLE CORRELATIONS WITH COLLEGE SUCCESS LISTED IN DESCENDING ORDER OF SIZE

Variables	Zero order coefficient	R	Reference
1. Battery : Army Alpha, Haggerty Delta, Pressey Class., Terman Group, & Miller M.A.T.	.48		
(average) High school honor point average	.79	.797	Finch & Nemzek (96)
2. A Apt. Test	.42		
High school marks	.79	.791	Finch & Nemzek (96)
3. Otis Group	.50		
High school marks	.65	.71	Edds & McCall (92)
4. Minn. Col. Apt. Test	.48		
High school ave. (men)	.68	.71	Williamson (189)
5. High school percentile	.43		
Wesley Test of S. T.	.65	.707	Douglass & Lovegren (84)
6. High school marks	.65		
Cross English Test	.44	.70	Edds (92)
7. Ohio State Psy. Ed.	.61		
High School Ave	.67	.69	Garrett (103)
8. High School average	.63		
Iowa Silent Read. (Comp.)	.42	.68	Read (151)
9. High school marks	.63		
Iowa H. S. Content	.44	.68	Read (151)
10. Average Teachers' Ratings	.64		Prescott &
Carnegie M. A.	.42	.67	Garretson (148)
11. American Council	.496		
Wesley Test of S. T.	.65	.661	Douglass & Lovegren (84)
12. High school average	.54		
Minn. Col. Apt. Test (women)	.54	.66	Williamson (189)
13. Wesley Test of S. T.	.65		
Minn. Col. Apt Test	.41	.654	Douglass & Lovegren (84)
14. High school average	.63		
& Ohio Univ. Psy. Test	.42	.64	Read (151)
15. American Council	.60		
& high school marks (men)	.40	.63	May (133)
16. Average Teachers' Ratings	.62		Prescott &
& Otis Self-Admin.	.21	.63	Garretson (148)

TABLE XIV (Continued)

Variables	Zero order coefficient	R	Reference
17. High school average	.56		
& H.S. percentile rank	.45	.63	Douglass (83)
18. A. C. E.	.45		
& English Average	.49	.63	Douglass (83)
19. American Council	.46		Williamson &
& H. S. percentile	.53	.63	Freeman (190)
20. A. C. E.	.46		Williamson &
& H. S. average (women)	58	.63	Freeman (190)
21. High School Average	.60		
& Iowa Silent Reading (rate)	.16	.63	Read (151)
22. Minn. C. A. T. &	.40		Williamson &
High school average (men)	.53	.62	Freeman (190)
23. Minn. C. A. T. &	.50		Williamson &
High school average (women)	.58	.62	Freeman (190)
24. Percentile (H. S.) Average	.45		
& Nat. Sc. average	.54	.61	Douglass (83)
25. High School Average	.53		Williamson &
& Ohio Univ. Psy. Ex. (men)	.53	.61	Freeman (190)
26. High school Average	.58		Williamson &
& Ohio Univ. Psy. Ex. (women)	.54	.61	Freeman (190)
27. High school percentile rank	.45		
& English average	.49	.59	Douglass (83)
28. Thorndike &	.41		
high school mark (men & women)	.52	.58	Proctor (150)
29. High school marks	.55		
& Otis Self-Admin.	.58	.58	Odell (139)
30. High school average	.56		
& English average	.49	.58	Douglass (83)
31. High school percentile rank	.45		
& Prin. Quartile rank	.48	.58	Douglass (83)
32. High school average	.56		
& social studies average	.44	.58	Douglass (83)
33. American Council	.496		
& high school percentile	.425	.573	Douglass & Lovegren (84)
34. High school average	.56		
& industry	.38	.57	Douglass (83)

TABLE XIV (Continued)

Variables	Zero order coefficient	R	Reference
35. High school average	.56		
& Princ. Quartile rank	.48	.57	Douglass (83)
36. High school percentile rank	.45		
& foreign language average	.46	.56	Douglass (83)
37. English average	.49		
& natural science average	.54	.56	Douglass (83)
38. English average	.49		
& foreign language average	.46	.55	Douglass (83)
39. High school percentile rank	.45		
& social studies average	.44	.55	Douglass (83)
40. High school percentile rank	.45		
& mathematics average	.44	.55	Douglass (83)
41. High school percentile rank	.45		
& Industry	.38	.55	Douglass (83)
42. College Aptitude	.51		
& Elem. School Achieve (women)	.51	.55	Durflinger (88)
43. Thorndike	.37		Bolenbaugh &
& high school marks	.49	.54	Proctor (57)
44. Miller M. A. T.	.46		
& Vocabulary	.44	.54	Cuff (80)
45. Otis Group	.50		
& Cross English	.44	.54	Edds (92)
46. Industry	.38		
& natural science average	.54	.54	Douglass (83)
47. College Apt. rank	.41		
& high school rank	.43	.524	Douglass & Lovegren (84)
48. Industry	.38		
& English average	.49	.52	Douglass (83)
49. High school rank	.43		
& college aptitude	.41	.524	Douglass & Lovegren (84)
50. Pattery (Intelligence)	.48		
& college aptitude	.42	.505	Finch & Nemzek (96)
51. Personal inventory	.41		
& composite entrance sc.	.47	.519	Thisted (174)
52. Industry	.48		
& mathematics average	.44	.50	Douglass (83)

TABLE XIV (Continued)

Variables	Zero order coefficient	R	Reference
53. Industry	.38		
& principals' quartile rank	.48	.50	Douglass (83)
54. Miller M. A. T.	.46		
& Whipple Reading	.36	.49	Cuff (80)
55. College Aptitude	.41		
& Elem. School Achieve. (men)	.47	.48	Durflinger (88)
56. Thorndike	.45		Eolenbaugh &
& high school marks	.28	.48	Proctor (57)
57. High school marks	.44		
& Iowa Silent Reading (Comp.)	.42	.48	Read (151)
58. Iowa Silent Reading (Comp.)	.42		
& Iowa High. School Content	.44	.49	Read (151)
59. Ohio Univ. Psych.	.42		
& Iowa Silent Reading (Comp.)	.42	.47	Read (151)
Total	119	59	
Range	.16 to .79	.47 to .79	
Median	.47	.58	

able combinations. . . . There is extremely little prespect that employing a fourth variable will add in the way of predictive effectiveness anything to that yielded by the best three variable combinations. (P. 49)

Hartson (16) found the highest 3-variable coefficient of correlation reported by combining high school marks, Ohio State University Psychological test and study performance test to get .75 in 1928. It is interesting to see, however, that he later reported in 1932 (110) an average coefficient of correlation of .625 by combining high school marks, intelligence, and total rating scale score of the classes entering the same college (Oberlin) in 1928 and 1929. This was considerably less than his high correlation obtained in his first study.

Douglass and Lovegren (84) combined the following variables: (1) high school percentile rank; (2) Wesley College Test of Social Terms; (3) American Council test; (4) Minnesota College Aptitude Test percentile rank. With college weighted standard score designed as "O" the multiple coefficients of correlation were:

R_O .1234 = .709	R_O .12 = .707
R_O .123 = .708	R_O .23 = .661
R_O .124 = .707	R_O .23 = .654
R_O .134 = .581	R_O .13 = .573
R_O .234 = .661	R_O .14 = .524
	R_O .34 = .511

Here, adding the third factor to a 2-factor combination improved the correlation an average of .065 points. However, adding the fourth factor to the 3-factor combination improved it only .001 point. The diminishing returns in combining more than two or three of the best variables is clearly shown.

Edds and McCall (92) with, (1) high school marks, (2) intelligence, and (3) English ability, found the following correlations:

R_O .12 = .71	R_O .23 = .54
R_O .13 = .70	R_O .123 = .81

Adding English ability to intelligence and high school marks, here, raised the correlation .10 points.

Finch and Nemzek (96) who found the remarkably high correlation of .797 by combining high school honor points and I.Q.'s got exactly the same by adding college aptitude test percentile rank to this combination. It should be pointed out, however, that only 90 students were used in this part of the study, and that these all came from the University High School of the University of Minnesota, where teachers' knowledge of previous performance of students no doubt resulted in higher correlations in the later college performance, than would have been the case if the students came from a number of high schools.

Pierson (145) in 1928, combined high school rank, interest, and character rating and found the multiple correlation of .65, when each variable correlated singly with the criterion .52, .44, and .33, respectively.

Prescott and Garretson (148) combined teachers' ratings, intelligence, and English aptitude and found a multiple correlation of .66 with college grades, while the single coefficients with the criterion were .64, .42, and .49, respectively.

Butsch (65) combined high school rank, Iowa High School Content Examination score, and A.C.E. Psychological Examination percentile and found the multiple correlation with first semester college work to be .65.

Borow (58) estimated in 1946, that all studies averaged a multiple coefficient of correlation of about .75 between intelligence, high school record, and content examination with college record. This makes the technique about 34% better than guess work.

Table XV gives a summary of prominent studies, listed in descending order according to the size of the multiple coefficient.

Table XIV showed the median of two-variable coefficients of correlation to be .58. In Table XV the median 3-variable coefficient is .61, while the average 4-variable falls back to .55. Three and four variable coefficients together have a median of .57. It becomes obvious, therefore, that the first few combinations in each of the tables have been found to combine the best prediction of college success. It can also be seen that, as many of the writers have stated, adding a third or more variable to a 2-variable multiple correlation ordinarily does not improve its predictive value to any appreciable extent. Only when the third or fourth predictor variable measures something not measured by the ones previously combined, is a higher multiple to be expected.

As Borow (58) has said as late as 1946:

> . . . . the greater part of the difference among college students in academic achievement is still unaccounted for by the prognostic instruments in current use. (P. 17)

Durflinger (88) in 1943, after reporting on twelve studies made since 1934, in multiple coefficients of correlation says:

1. Multiple coefficients of correlation are rarely higher than .80 regardless of the variables used.
2. An intelligence test, a good achievement test, and high school averages, together usually bring the highest multiple correlations. The median multiple r as found in the summaries is between .60 and .70. (P. 77)

TABLE XV

THREE OR MORE VARIABLE MULTIPLE CORRELATIONS WITH COLLEGE SUCCESS

Reference	Variables	R
	Three Variable Combinations	
1. Drake (85)	High school marks, English ability, interest	.81
2. Edds & McCall (92)	High school marks, intelligence, and English ability	.81
3. Finch & Nemzek (96)	High school honor points, I.Q., and college aptitude	.80
4. Harston (16)	High school marks, Ohio Psychological Examination, and study reference	.75
5. Williamson (189)	Personal history blank, Minnesota C.A.T. and high school percentile	.71
6. Douglass & Lovegren (84)	High school percentile, Wesley Test, and A. C. E. Psychological Examination	.71
7. Douglass & Lovegren (84)	High school percentile, Wesley Test, and Minnesota C. A. T.	.71
8. Williamson (189)	Personal history blank, Minnesota C. A. T. and high school percentile	.67
9. Prescott & Garretson (148)	Teachers' Ratings, interest, and English aptitude	.66
10. Pierson (145)	High school rank, interest, and character	.65
11. Douglass (83)	High school average, high school percentile, and industry	.64
12. Butsch (78)	High school rank, Iowa H. S. Content, and A. C. E. Psychological Examination	.65
13. Douglass (83)	High school average, high school percentile, and English average	.63
14. Douglass (83)	High school average, high school percentile, and principal's quartile rating	.63
15. Douglass (83)	Principal's quartile rating, industry, and natural science average	.63
16. Douglass (83)	Percentile rank, English average, and natural science average	.62
17. Douglass (83)	Percentile rank, English average, and foreign language average	.61
18. Douglass (83)	High school average, percentile, and social studies average	.61

TABLE XV (Continued)

Reference	Variables	R
19. Douglass (83)	High school average, English average, and mathematics average	.61
20. Douglass (83)	Industry, mathematics average, and principal's quartile raning	.59
21. Durflinger (88)	College aptitude, elementary school achievement, and high school English (men)	.54
22. Durflinger (88)	College aptitude, elementary school achievement, and high school English (women)	.55
	Four-Variables or More	
1. Douglass & Lovegren (84)	High school percentile, Wesley Test, A.C.E. Psychological Examination, and Minnesota C.A.T.	.71
2. Douglass (83)	High school average, percentile rank, principal's rating, and industry	.64
3. Durflinger (88)	College aptitude, elementary school achievement, English, and music (men)	.54
4. Durflinger (88)	College aptitude, elementary school achievement, English, and music (women)	.55
5. Durflinger (88)	College aptitude, elementary school achievement, music, and personality (men)	.54
6. Durflinger (88)	College aptitude, elementary school achievement, English, music, and personality (women)	.56
7. Durflinger (88)	College aptitude, elementary school achievement, English, music, personality, and personality, and personal data (men)	.54
8. Durflinger (88)	College aptitude, elementary school achievement, English, music, personality, and personal data (women)	.56

Median of three-variable coefficients	.61
Median of four-or-more variable combinations	.55
Median of three-variable and four-or-more variable combinations	.57

The present study agrees with all of these former observations.

C. Summary and Conclusions

1. Intelligence is most often used in combination with other variables in multiple correlations.
2. Adding high school marks to intelligence raised the latter's zero order coefficient of correlation with the criterion an average of .157 points.
3. Adding intelligence to high school average raised the latter's zero order coefficient of correlation with the criterion an average of .09 points.
4. Therefore, high school average bears the closest relation to college grades.
5. Other variables found to improve intelligence test scores in multiple correlation were a vocabulary test and the Wesley Test of Social Terms.
6. Interest tests and personality tests add very little if anything to intelligence as a predictor of college success.
7. Other variables which proved valuable in multiple coefficients of correlation included college aptitude, Cross Engineer Test, Iowa Silent Reading Test, Average Teachers' Ratings, elementary school achievement, and certain high school subject averages.
8. Employing a third variable adds but little to a 2-variable combination, and adding a fourth improves it practically none.
   a. Coefficients of correlation in the seventies and eighties were reported from 3 and 4 variables combination of factors: (1) high school average; (2) intelligence; (3) study performance test; (4) Minnesota College Aptitude Test; (5) Wesley College Test of Social Terms; (6) High School English, Social Studies, mathematics and science, averages used separately.
9. The average multiple coefficient of correlation is about .75 between intelligence, high school record, and content examination with college record, or about 34% better than guess work.
10. Multiple coefficients of correlation between factors and the criterion are rarely ever higher than .80.
11. The greater part of the differences between the academic achievement of college students is still largely unaccounted for by prognostic instruments now in use.

SECTION VIII

CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

A. Conclusions

The five factors which have the greatest predictive value, and their average coefficient of correlation with average college grades are:

Factor	Median r
1. High School Scholarship	
a. High School Average	.56
b. Rank in graduating class percentile rank, quartile rank, principal's rating, number of "A's" and "B's" and other methods of reporting high school scholarship	.55
2. General Achievement Test Scores	.49
a. Achievement Test Scores in Specific Subjects or Fields	.40
3. Intelligence Test Scores	.47
4. General College Aptitude Test Scores	.43
5. Special Aptitude Test Scores	.41

A survey of the studies summarized in the present review, seems to justify the following conclusions:

1. High School Scholarship
   a. High school scholarship correlates more highly with first year college grades than with any lesser or greater amount of the entire college record.

   b. There is no consistent difference between men and women in the relation of their high school standing and later college work.

   c. When the college records of students from a single high school are compared with their high school record, a higher coefficient of correlation is usually found, than when students from many high schools are involved in the study. Also, studies of the records of students from the same high school attending the same college, reveal even higher coefficients of correlation. This would indicate that more uniform high school and college grading systems from which more comparable records may be obtained, would improve the predictive value of such records.

   d. Although some degree of correlation has been found between high school grades in specific subjects and later college scholarship, no particular subject or group of subjects has exclusive right to this relationship. Grades in "non-academic" subjects apparently have as much predictive value as do grades in the "academic" subjects.

e. The pattern of high school subjects taken, has little relation to later scholastic success in college.

f. The number of total units earned in high school has little positive relationship to college scholarship.

g. The number of units of credits in any one high school subject or field has very little, if any, relationship to college success.

2. Achievement Tests

a. The college Entrance Examination Board examinations were used in the majority of cases reported.

b. Considering the time and expense involved, it is as well to use a good aptitude test to predict college success as to use a battery of achievement tests. Especially is this true for long-range predictions.

c. Although achievement tests in Latin, French, and the sciences appear to be superior instruments of prediction, it is generally believed that such subjects "select" superior intellects, rather than "make" them.

d. Knowledge of history and science correlates higher with the criterion than does oral and written English.

e. Achievement test scores tend to correlate lower with college average in later studies than in earlier studies. This is possibly due to the shift in emphasis in high school from factual learning to general education, and the continuing tendency for measuring instruments to measure mostly academic knowledge.

f. To use achievement test scores as a sole criterion for college entrance may, in many instances, deprive a student from entering college who would be successful there if allowed to enter.

3. Intelligence

a. Intelligence test scores for women are correlated more closely with college success than are the scores of men.

b. The American Council on Education Psychological Examination scores correlated more closely with college averages than did the scores of other intelligence tests reported.

c. A good intelligence test will predict college success better for good students than for poor ones.

d. Students concentrating their college courses in one department or school in college tend to show a closer correlation between intelligence and college grades than do students of the general college. This is thought to be due to either the motivation of common purpose in departments or schools, or to the fact that the college scholarship of the former group is measured in the same subjects for all, to a greater extent than for the general college group.

e. Intelligence test scores are correlated closely with achievement test scores.

f. Selective influence tends to send to college those students who rank in the upper fourth in scholarship in high school.

g. In a few studies, intelligence of students with low neurosis correlated somewhat more closely with college grades than did the intelligence of those with high neurosis. Those with high self-sufficiency and dominance also tended to have closer correlation between intelligence and college average than those with low self-sufficiency and dominance. But instruments of sufficient validity and reliability in the field of personality testing have not been developed or sufficient research made, to establish this tendency to any degree of certainty.

h. Closer correlations are obtained by equating the I.Q.'s obtained from several good intelligence tests and computing the coefficient of correlation with college honor point averages.

i. From the few studies reported, intelligence tests given as early as the fourth grade predict college success almost as well as those given in the last year of high school.

j. It is estimated that the average coefficient of correlation between this factor and the criterion is about .45 or 11 percent better than guess work.

4. Aptitude Tests

a. The Wesley College Test of Social Terms yielded the highest correlation with college success.

b. The Minnesota University College Aptitude Test was the most popular among the writers, but variety of results obtained by it leaves question as to its reliability.

c. The Nelson-Denny Reading Test gives a good indication of probable college success, no doubt due to the reasonable assumption that there is a close relationship between one's ability to read and his probable success in college.

d. The Cross-English Test as an aptitude test, showed up well but vocabulary is a better indicator of college success than knowledge of grammatical forms and rules.

e. The Iowa High School Content Examination scores as a whole are a good criterion for predicting college success, but scores on individual subjects or fields are not reliable enough to be a significant factor in prediction.

5. Others

a. No test of personality or character has yet been devised which will predict to any appreciable extent, the scholastic success of a student in college.
   (1) Certain rating scales, however, in the hands of principals and teachers, apparently have real possibilities in predicting scholastic success for students in college. Especially is this true in the items of interest, ability to do college work, industry, leadership, and citizenship.

b. There is little or no relationship between the size of high school and probable college success, although some studies show a slight tendency for students from smaller schools to receive somewhat lower college averages.

c. Down to a minimum of fifteen years of age, there is a slight tendency for those who enter college younger than the average to receive slightly better college grades than the average.

d. Studies seem to indicate that there is very little if any relationship between the following and college success:
   (1) salary of teachers in high school
   (2) occupation of parents
   (3) student's physical factors

e. As judged by multiple correlation coefficients of two factors predictive of college success, usually results in a somewhat higher correlation with the criterion than did the factors singly.
   (1) The most prognostic combinations include:
      (a) high school marks and intelligence test score
      (b) high school marks and aptitude test score
      (c) intelligence test score and achievement test score
   (2) The addition of a third variable adds very little to the predictive value of the combination, and adding a fourth variable has practically no value.

B. Implications and Recommendations

The data reveal that many colleges are basing their entrance requirements on factors which do not have adequate value in predicting success in college, and therefore deny entrance to many students who should be admitted. The absence of any significant correlation between amount and pattern of high school subjects and college scholarship persists in spite of the broadening of high school curricula to include vocational subjects and the reluctance of colleges to vary in a corresponding degree from the original scholastic curriculum heavily loaded with verbal learning.

The present emphasis on college training may result in a shift in emphasis from the purely academic to the development of the somewhat more inclusive aspects of personality and character development as prepared by the General Education movement. Or the trend may be the development of more pure measures of primary mental abilities and the discovery of the patterns of these abilities required by the various curricula and vocational areas. This would not require great change in present day curricula but would more effectively screen entering students and guide them into the field for which they are best adapted. Some have suggested that we are now in the profile stage with educational measurement where we know that a student stands high on an aptitude test, relatively low in an arithmetic tes, and so on, but do not know quite how to interpret these facts in terms of probable college success. This may be similar to the second stage arrived at by geneticists in their conclusions that inherited traits are handed down from parent to offspring through the particular arrangement of the genes within the chromosome. But the possibilities of combinations of these genes became a very complex problem. So with us, if we could find some means of determining the order of importance of the various characteristics in the profile, we might have a better basis for predicting success in any given college. To find this order and the hidden factor contained in it is our next step.

BIBLIOGRAPHY

BOOKS

1. Allen, W. S. A Study of Latin Prognosis, Contributions to Education, No. 135 (New York: Teachers College, Columbia University, 1922), 41 pp.

2. Blair, J. L. Significant Factors in the Prediction of the Success of College Freshmen (Chicago: University of Chicago Libraries, 1933).

3. Boe, O. G. The Relation Between Size of High School Attended and Scholastic Success in College, Unpublished Master's Thesis. University of Chicago, 1930.

4. Brammell, P. Roy. Articulation of High School and College, Bulletin No. 17 (Washington, D. C.: U. S. Office of Education, 1932).

5. Brock, Earl E. Prediction of Success of College Students in Latin, Spanish, and French, Unpublished Master's Thesis. University of Colorado, 1935.

6. Catalogue of Union College, 1854.

7. Chamberlin, Dean, Chamberlin, Enid, and others, Did They Succeed in College? (New York: Harper and Brothers, 1942).

8. Cleeton, Glenn U. Report on the Thorndike Intelligence Test (Pittsburg: Department of Education and Psychology, Carnegie Institute of Technology, 1927).

9. Clem, O. M. Latin Prognosis: A Study of the Detailed Factors of Individual Pupils, Contributions to Education, No. 144 (New York: Teachers College, Columbia University, 1924).

10. Cocking, W. D. and Holy, T. C. The Relation of Intelligence Scores to High School and University Marks, Educational Bulletin No. VI (Iowa City: University of Iowa, 1927).

11. Edgerton, Harold A. Academic Prognosis in the University (Baltimore: Warwick and York, Inc., 1930).

12. Eurich, A. C. and Cain, L. F. Prognosis, Encyclopedia of Educational Research (New York: The MacMillan Co., 1941).

13. Friedman, Kopple, The Relation of Certain Factors to Achievement in College Social Studies and History, Master's Degree Thesis, University of Minnesota, 1932.

14. Gebhardt, G. L. Relative Values of College Entrance Subjects, Unpublished Master's Thesis, Colorado State Teachers College, Greeley, 1923.

15. Gerberich, J. B. A Personnel Survey of 1000 Iowa High School Seniors, Studies in Education, No. 3 (Iowa City: Iowa University, 1929-30).

16. Harston, L. D. The Most Valid Combination of Twenty-Three Tests for Predicting Freshman Scholarship at Oberlin College, Oberlin College Association Bulletin (Columbus, Ohio: Oberlin College, 1928).

17. Hull, Clark L. Aptitude Testing, 1928.

18. Keys, Noel, The Underage Student in High School and College: Educational and Social Adjustments (Berkeley, California: University of California Press, 1938).

19. Kinney, Lucien B. An Analysis of the Literature Dealing with Intelligence Testing in Colleges and Universities, Unpublished Paper, Minneapolis Committee on Educational Research, University of Minnesota, 1931.

20. Kinney, Lucien B. The Use of Aptitude Tests for Subjects Taught at the College Level, Unpublished Paper, Iowa University, 1944.

21. Learned, William S. and Wood, Ben D. The Student and His Knowledge, Bulletin No. 29, The Carnegie Foundation for the Advancement of Teaching, 1938.

22. Lloyd-Jones, E. M. Student Personnel Work (New York: Harper and Brothers, 1929).

23. Manson, Grace, An Investigation of Some Problems Involved in Student Selection at the University of Michigan, Unpublished Treatise on file at the Office of Educational Investigations of the University of Michigan, 1927.

24. Miller, L. W. An Experimental Study of the Iowa Placement Examinations, University of Iowa Studies in Education, No. 6 (Iowa City: University of Iowa, 1930).

25. Mills, Hubert H. Predicting Scholastic Success in College at the Time of Entrance, University of Colorado Studies, No. 4 (Boulder: University of Colorado, 1936).

26. McKnown Harry C. The Trend of College Entrance Requirements, 1913-1922, Bulletin No. 35 (Washington, D. D.: U. S. Bureau of Education, 1924).

27. MacPhail, A. H. The Intelligence of College Students (New York: Warwick, 1924).

28. Odell, Charles W. Predicting the Scholastic Success of College Freshmen, Bulletin No. 37 (Urbana, Illinois: Bureau of Educational Research, University of Illinois, 1929).

29. Odell, C. W. Predicting the Scholastic Success of College Students, Bulletin No. 52 (Urbana, Illinois: Bureau of Educational Research, University of Illinois, 1930).

30. Prosser, M. R. Study of Scholastic Performance of Freshmen Women of the University of Iowa, University of Iowa Studies in Education (Iowa City: University of Iowa, 1930).

31. Reeves, F. M. and Russell, J. D. Admission and Retention of University Students, Part VI, "The Value of Standardized Tests for Predicting Undergraduate Scholarship" (Chicago: University of Chicago Press, 1933)

32. Reeves, F M. and Russell, J. D. Admission and Retention of University Students, Part VII, "The Relationship Between Specialization in Secondary School and Success in College Courses" (Chicago: University of Chicago Press, 1933).

33. Schultz, Irwin Tabor. A Descriptive and Predictive Study of a Class in a School of Education, Unpublished Ph.D. Dissertation, University of Pennsylvania, 1928.

34. Shimberg, Benjamin, Summary of Validity Studies of the College Entrance Examination Board Tests in Current Use, Unpublished Compilation of Studies prepared for use of Staff Members of the College Entrance Examination Board, 1946.

35. Somers, G. T. Pedagogical Prognosis and Predicting the Success of Prospective Teachers, Contributions to Education, No. 140 (New York: Teachers College, Columbia University, 1924).

36. Symonds, P. M. A Modern Foreign Language Prognosis Test (New York: MacMillan Co., 1929).

37. Symonds, P. M. Measurement in Secondary Education, (New York: MacMillan Co., 1929).

38. Thornburg, L. H. College Scholarship and Size of High School, Unpublished Master's Thesis, State College of Washington, 1924.

39. Tomlinson, Lawrence E. College Entrance Requirements, (Portland, Oregon: Educational Studies, 1944).

40. Whitman, A. D. The Value of the Examinations of the College Entrance Examination Board as Predictive of Success in College (New York: Teachers College, Columbia University, 1926).

41. Wood, Ben D. Measurement in Higher Education (New York: World Book Co., 1923).

PERIODICALS

42. Anderson, J. E. Spenser, L. T. "The Predictive Value of the Yale Classification Tests," School and Society, XXIV (September 1926), pp. 305-312.

43. Alexander, Norman, and Woodruff, Ruth J. "Determinants of College Success," Journal of Higher Education, XI (December 1940), pp. 479-485.

44. Arlitt, Ada H. and Hall, Margaret, "Intelligence Tests Versus Entrance Examinations as a Means of Predicting Success in College," Journal of Applied Psychology, VII (March 1923), pp. 330-338.

45. Archer, J. K. "Prediction of Success of Scholars," School and Society, XLI (April 1935), pp. 573-575.

46. Ashmore, B. "High School Teachers' Marks as Indicators of College Success," American Association of College Registrars, XXI (January 1946), pp. 219-230.

47. Attender, Louise E. "The Value of Interest, Personality, and Vocational Interest Tests in the Guidance Program," Journal of Educational Psychology, (September 1940), pp. 449-452.

48. Atkinson, B. H. and Webb, R. W. "Academic Success of Rehabilitation Veterans," School and Society, LXIV (August 1946), pp. 87-88.

49. Averill, L. A. "Mental Survey of Fifty-Nine Normal School Students: Some Correlations and Criticisms," Journal of Educational Research, VII (April 1923), pp. 331-337.

50. Averill, L. A. and Mueller, A. D. "Some Results of Intelligence Tests in English Given to Entering Normal School Students," Educational Administration and Supervision, XIII (January 1927), pp. 20-25.

51. Beatley, E. "The Relative Standing of Students in Secondary School in Comprehensive Entrance Examinations and in College," School Review, XXX (February 1922), pp. 141-147.

52. Bent, R. K. "Scholastic Records of Non-High School Graduates Entering the University of Arkansas," Journal of Educational Research, XL (October 1946), pp. 108-115.

53. Berg, I. A. Larsen, R. P. and Gilbert, W. M. "Scholastic Achievement of Students Entering College From the Lowest Quarter of Their High School Graduating Class," Journal of American Association of College Registrars, XX (1944), pp. 53-59.

54. Binnewiess, W. G. "Freshman Grades and Mental Tests," Educational Administration and Supervision, IX (March 1923), pp. 161-162.

55. Bixler, Roy. "Rating the College Entrant," Journal of Higher Education, III (October 1923), pp. 361-365.

56. Blayne, T. C. and Kaulfers, W. V. "College Entrance Requirements: Hazards to Curriculum Revisions," School and Society, LV (April 1942), pp. 14-24.

57. Bolenbaugh, Lawrence, and Proctor, W. M. "Relation of the Subjects Taken in High School to Success in College," Journal of Educational Research, XV (February 1927), pp. 87-92.

58. Borow, Henry, "Current Problems in the Prediction of College Performance," American Association of College Registrars, XXII (October 1946), pp. 14-24.

59. Bridges, J. W. "The Correlation Between College Grades and the Alpha Intelligence Tests," Journal of Educational Psychology, XI (October 1920), pp. 361-367.

60. Bridges, J. W. "The Value of Intelligence Tests in Universities," School and Society, XV (March 1922), pp. 295-303.

61. Briggs, T. H. "Prognosis Tests of Ability to Learn Foreign Languages," Journal of Educational Research, VI (1922), pp. 386-392.

62. Brogden, H. E. "On the Interpretation of the Correlation Coefficient as a Measure of Predicting Efficiency," Journal of Educational Psychology, XXXVII (February 1946), pp. 65-76.

63. Brown, A. H. and Nemzek, C. L. "A Comparative Study of the College Success of Recommended and Non-Recommended Students from One Detroit High School," Journal of Social Psychology, XX (1944), pp. 277-281.

64. Burwell, W. R. and MacPhail, A. E. "Some Practical Faults of Psychological Testing at Brown University," School and Society, XXII (July 1925), pp. 48-56.

65. Butsch, R. L. C. "Improving the Prediction of Academic Success Through Differential Weighting," Journal of Educational Psychology, XXX (September 1939), pp. 401-420.

66. Byrns, Ruth K. "Scholastic Aptitude and Freshman Achievement," School and Society, XXXV (May 1932), pp. 713-718.

67. Byrns, R. K. and Henmon, V. A. C. "Long Range Prediction of College Achievement," School and Society, XLI (June 1935), pp. 877-880.

68. Byrns, Ruth, and Henmon, V. A. C. "Entrance Requirements and College Success," School and Society, XLI (January 1935), pp. 101-104.

69. Carter, Thomas N. "A Standardized Mental Test or an Unstandardized English Test as a Means of Predicting Success in College English," School and Society, XXVI (July 1927), pp. 151-153.

70. Chambers, O. R. "Character Trait Tests and the Prognosis of College Achievement," Journal of Abnormal and Social Psychology, XX (1925), pp 303-311.

71. Clark, E. L. "Selection of Freshmen at Northwestern University College of Liberal Arts," Educational Record, VIII (April 1927), pp 122-128.

72. Clark, E. L. "High School Average Versus High School Class Rank as a Means of Predicting College Grades," School and Society, XXXIV (December 1931), pp. 765-766.

73. Colvin, S. S. "The Use of Intelligence Tests." Educational Review, XII (September 1921), pp. 134-148.

74. Condit, P. M. "The Prediction of Scholastic Success by Means of Classification Experiment." Journal of Educational Research, XIX (May 1929), pp. 331-336.

75. Crawford, A. B. "Forecasting Freshmen Achievement." School and Society, XXXI (January 1930), pp. 125-130.

76. Crawford, A. B. "Forecasting Certain College Aptitudes." Personnel Journal, II (1932), pp. 160-168.

77. Crawford, A. B. and Burnham, P. S. "Entrance Examinations and College Achievement." School and Society, XXXVI (September 1932), pp. 344-352.

78. Crawford, A. B. and Burnham, P. S. "Trial at Yale University of the Armed Forces Institute Educational Development Tests." Educational and Psychological Measurement, (Winter 1944), p. 267.

79. Crawley, W. H. "An Historical and Statistical Analysis of College Admissions Criteria." Association of American Colleges Bulletin, XXVI (December 1940), pp. 522-567.

80. Cuff, N. B. "Prognosis of and Diagnosis of Success in College." Journal of Applied Psychology, XIV (December 1930), pp. 612-619.

81. Day, E. E. "Academic Achievement of Veterans at Cornell University." School and Society, LXV (February 1947), pp. 101-102.

82. DeCamp, J. E. "Studies in Mental Tests," School and Society, XIV (October 1921), pp. 254-258.

83. Douglass, Harl R. "The Relation of High School Preparation and Certain Other Factors to Academic Success at the University of Oregon." University of Oregon Publication, Education Series III (September 1931), 61 pp.

84. Douglass, Harl R. and Lovegren, L. A. "Prediction of Success in the General College." Unpublished study, University of Minnesota, 1937.

85. Drake, C. A. "A Study of an Interest Test and an Affectivity Test in Forecasting Freshman Success in College." Teachers College Contributions to Education, No. 504, (1931), 60 pp.

86. Dressel, Paul L. "Effect of the High School on College Grades," Journal of Educational Psychology, XXX (November 1939), pp. 612-617.

87. DuBois, Philip H. "Achievement Ratios of of College Students," Journal of Educational Psychology, XXX (December 1939), pp. 699-702.

88. Durflinger, G. W. "Scholastic Prediction in a Teachers College." Journal of Experimental Education, XI (June 1943), pp. 257-267.

89. Durflinger, G. W. "Prediction of College Success: A Summary of Recent Findings." American Association of College Registrars, XIX (October 1943), pp. 68-78.

90. Dwyer, Paul S. "The Correlation Between Age at Entrance and Success in College," Journal of Educational Psychology, XXX (1939), pp 251-263.

91. Dwyer, P. S. "Some Suggestions Concerning the Relationships Existing Between Size of High School Attended and Success in College," Journal of Educational Research, XXXII (December 1938), pp. 271-281.

92. Edds, H. J. and McCall, W. M. "Predicting the Scholastic Success of College Freshmen." Journal of Educational Research, XXVII (October 1933), pp. 127-131.

93. Ellefson, E. T. "Predicting College Freshmen Scholarship," California Quarterly of Secondary Education, III (January 1928), pp. 179-185.

94. Ernst, J. L. "Psychological Tests vs First Semester Grades as a Measure of Academic Prediction." School and Society, XVIII (October 1923), pp. 419-440.

95. Feder, D. D. "Factors Which Affect Achievement and Its Prediction at the College Level" American Association of College Registrars, XV (January 1940), pp. 117-118.

96. Finch, F. H. and Nemzek, C. L. "Prediction of College Achievement from Data College

96. Finch, F. H. and Nemzek, C. L. "Prediction of College Achievement from Data Collected During the Secondary School Period." Unpublished paper, University of Minnesota, 1934.

97. Flemming, E. G. "The Predictive Value of Certain Tests of Emotional Stability as Applied to College Freshmen," Archives of Psychology, XV (May 1928), pp. 61-69.

98. Flemming, E. G. "College Achievement, Intelligence, Personality and Emotion," Journal of Applied Psychology, XVI (1932), pp. 668-674.

99. Flory, Charles D. "Skeletal Maturity and Achievement of College Freshmen," American Association of College Registrars, XV (April 1940), pp. 223-228.

100. Frazier, G. W. "The Experience of Colorado State Teachers College with New Entrance Requirements," The North Central Association Quarterly, VI (March 1932), pp. 351-358.

101. Fricken, C. E. " Predicting Achievement in the Liberal Arts College," School and Society, XLII (October 1935), pp. 518-520.

102. Fritz, R. A. "Predicting College Marks and Teaching Success in a Teachers College," Journal of Applied Psychology, XVII (August 1933), pp. 439-446.

103. Garrett, W. S. "Ohio State Psychological An Instrument for Predicting Success in College," Occupations, XXII (May 1944), pp. 489-495.

104. Gerberich, J. R. "Factors Related to College Achievement of High School Students Who Fail of Expectation and Low Aptitude Students Who Exceed Expectations," Journal of Educational Psychology, XXXII (April 1941), pp. 253-265.

105. Gilliland, A. R. and Voos, W. H. "Personality Tests and Scholastic Achievement," Personnel Journal, IX (December 1930), pp. 305-308.

105. Gilliland, A. R. and Voos, W. H. "Personality Tests and Scholastic Achievement," Personnel Journal, IX (December 1930), pp. 305-308.

106. Goldthorpe, J. Harold. "The Relative Rank in High School in the First Two Years of the University," School and Society, XXX (July 1929), pp. 130-134.

107. Gowen, J. W. and Gooch, M. "The Mental Attainments of College Students in Relation to Previous Training," Journal of Educational Psychology, XVI (1925), pp. 547-568.

108. Gowen, J. W. and Gooch, M. "Age, Sex, and the Inter-Correlations of Mental Attainments of College Students," Journal of Educational Psychology, XVII (March 1926), pp. 195-207.

109. Griffiths, G. R. "The Relationship between Scholastic Achievement and Personality Adjustment of Men College Students," Journal of Applied Psychology, XXIX (1945), pp. 360-367.

110. Guiler, W. S. "The Predictive Value of Group Intelligence Tests," Journal of Educational Research, XVI (December 1927), pp. 365-374.

111. Harris, Daniel, "The Relation to College Grades of Some Factors Other than Intelligence," Archives of Psychology, XX (1931-1932), 55 pp.

112. Hartson, L. D. "The Validation of the Rating of 23 Tests for Ppre

ing of 23 Tests for Predicting Freshmen Scholarship at Oberlin College," School and Society, XXXVI (September 1932), pp. 413-416.

113. Held, O. C. "Does N Y A Work Affect the Academic Record of College Students?" School and Society, L (August 1939), p. 192.

114. Hepner, Walter R. "Factors Underlying Unpredicted Scholastic Achievement of College Freshmen," Journal of Experimental Education, VII (March 1939), pp. 159-198.

115. Heston, J. C. "Use of Non-Verbal Tests in the Prediction of Academic Success," Journal of Educational Psychology, XXXIII (November 1942), pp. 608-614.

116. Hilts, Elizabeth A. "The Academic Achievements of Honor Entrance Scholarship Holders in the College of Liberal Arts, University of Chicago, 1941-42 and 1942-43," Journal of American College Registrars, XX (1945), pp. 326-349.

117. Hughes, T. H. "Personality Traits and the College Success of High School Graduates," California Quarterly of Secondary Education, California Quarterly of Secondary Education, I (1925-1926), pp. 225-236.

118. Holmes H. W. "Youth and the Dean: The Relation Between Academic Discipline, Scholarship, and Age of Entrance to College," Harvard Graduate Magazine, XXI (June 1913), pp. 599-610.

119. James, Adam Leroy, "College Standing of Freshmen of Various Ages," School and Society, III (May 1916), pp. 717-720.

120. Johnson, J. B. "Tests for Ability Before College Entrance," School and Society, XV (April 1922), pp. 345-353.

121. Johnson, J. B. "Predicting Success or Failure in College at the Time of Entrance," School and Society, XIX (June 1924), pp. 27-32.

122. Jones, A. A. "The Prognostic Value of the Low Range Alpha Scores," Journal of Educational Psychology, XX (1929), pp. 536-541.

123. Jones, J. W. "Study of Certain Problems Dealing with Scholastic Achievement in a Teachers College," Indiana University School of Education Bulletin, V (April 1929), pp. 33-40.

124. Kaulfers, W. V. "Why Prognose in Foreign Language?" Modern Language Journal, XIV (1930), pp. 296-301.

125. Keys, Noel, "The Value of Group Test I.Q.'s for Prediction of Progress Beyond High School," Journal of Educational Psychology, XXXI (February 1940), pp. 81-92.

126. Kvaraceus, W. C. and Baker, James, "The Achievement of Veterans and Non-Veterans in One Required Course at Boston University," School and Society, LXIV (November 1946), pp. 384-385.

127. Langlie, T. A. "Analysis of the Iowa Placement Tests," Journal of Applied Psychology, X (1929), pp. 303-314.

128. Leonard, Paul J. "Can We Face the Evidence on College Entrance Requirements?" School Review, LIII (June 1945), pp. 327-335.

129. Louttit, C. M. "Intelligence Tests in Hobart College," School and Society, XXII (September 1925), pp. 312-314.

130. March, C. J. "The Prognostic Value of Washburne Social Adjustment Inventory," Journal of Social Psychology, XVII (1943), pp. 287-294.

131. Markt, A. R. and Gilliland, A. R. "A Critical Analysis of the George Washington University Teaching Aptitude Test," Educational Administration and Supervision, (1929), pp. 660-666.

132. Martin, Lycus O. "The Prediction of Success for Students in Teacher Education," Bureau of Publications, Teachers College, Columbia University, New York (1944), 110 pp.

133. May, Mark A. "Predicting Academic Success," Journal of Educational Psychology, XIV (1923), pp. 429-440.

134. Munroe, R. L. "Prediction of the Adjustment and Academic Performance of College Students by a Modification of the Rorschark Method," Applied Psychology Monograph, No. 7 (1945), 104 pp.

135. Murray, Elsie, "Freshman Tests in a Small College," Journal of Applied Psychology, VII (September 1923), pp. 258-276.

136. Nelson, M. J. "Some Data From Freshman Tests," School and Society, XXXI (June 1930), pp 772-774.

137. Nelson, M. J. "Study in the Value of Entrance Requirements for Iowa State Teachers College," School and Society, XXXVII (February 1933), pp 262-264.

138. Nemzek, C. L. "The Value of Certain Non-Intellectual Factors for Direct and Differential Prediction of Academic Success," Journal of Social Psychology, XII (1940), pp. 21-30.

139 Odell, Charles W. "An Attempt at Predicting Success in the Freshmen Year at College," School and Society, XXV (June 1927), pp. 702-706.

140. Odell, C. W. "Predicting the Scholastic Success of College Students," Bureau of Educational Research Bulletin, College of Education, University of Illinois (1930), 43 pp.

141. Odell, C. W. "The Effect of Early Entrance Upon College Success," Journal of Educational Research, XXVI (1933), pp. 510-512.

142. Orleans, J. S. and Solomon, M. "A Study in Latin Prognosis," Classical Journal, XXIV (1928), pp. 174-190.

143. Patterson, Dale.O. "The Relationship Between Certain Factors and Scholastic Success in the University of Minnesota College of Education," Bulletin of the American Association of Collegiate Registrars. XII (April 1937), pp. 191-201.

144. Paul, J. B. "Placement Test Scores vs College Academic Attainment," School and Society, XLVIII (October 1938), pp. 506-508.

145. Pearson, Gaynor, "The Veteran versus the Professor," School and Society, LXII (Sep-

tember 1945), pp. 131-132.

146. Pierson, C. D. and Nettels, C. H. "A Study of High School Seniors to Determine Who Shall be Admitted to College," School and Society, XXVIII (September 1928), pp. 215-216.

147. Pittenger, B. F. "The Efficiency of College Students as Conditioned by Ages at Entrance and Size of High School," Sixteenth Yearbook of the National Society for the Study of Education, Part II (1917), pp. 9-112.

148. Prescott, A. C. and Garretson, O. K. "Teachers' Estimates of Success in College," School Review, XLVIII (April 1940), pp. 278-284.

149. Pressey, S. L. "Acceleration the Hard Way," Journal of Educational Research, XXXVII (April 1944), pp. 561-570.

150. Proctor, William M. "The High School's Interest in Methods of Selecting Students for College Admission," School and Society, XXVIII (October 1925), pp. 441-448.

151. Read, C. B. "Prediction of Scholastic Success in a Municipal University," School and Society, XLVIII (August 1938), pp. 187-88.

152. Read, C. B. "Effect of Time Between High School and College," Journal of Higher Education, XII (October 1941), pp. 388-390.

153. Reitz, Wilhelm, "A Method of Adjusting School Marks and Class Ranks to Compensate for Variations in Standards of Marking," Bulletin of the American Association of College Registrars, IX (October 1933), pp. 1-14.

154. Reitz, Wilhelm, "Predicting College Achievement with Marks and Ranks Adjusted for Inter-High School Variability," Bulletin of the American Association of College Registrars, IX (April 1934), pp. 162- 181.

155. Reitz, Wilhelm, "Forecasting Marks of New Plan Students at the University of Chicago," School Review, XLIII (January 1935), pp. 34-48.

156. Requa, Dorothy, "Does High School Rank Determine College Success?" American Association of College Registrars, XVI (April 1941), pp. 299-305.

157. Rich, S. G. and Skinner, C. E. "Intelligence Among Normal School Students," Educational Administration and Supervision, XI (December 1925), pp. 629-644.

158. Roberts, A. C. "Objective Measures of Intelligence in Relation to High School and College Administration," Educational Administration and Supervision, VIII (December 1922), pp. 530-540.

159. Root, W. T. "The Freshman: Thorndike Collegiate Entrance Tests, First Semester Grades, Binet Tests," Journal of Applied Psychology, VII (March 1923), pp. 77-92.

160. Rosenfield, M. A. and Nemzek, C. L. "Long Range Prediction of College Marks," School and Society, XLVII (January 1938), pp. 127-128.

161. Rosenow, C. "Predicting Academic Achievement," Pedagogical Seminar, XXXII (December 1925), pp. 628-636.

162. Ross, C. F. "A Method of Forecasting College Success," School and Society, XXXIV (July 1931), pp. 20-22.

163. Sabine, T. R. "Contributions to the Study of Actuarial and Individual Methods of Prediction," American Journal of Sociology, XLVIII (March 1943), pp. 593-602.

164. Scates, D. E. "A Study of High School and First Year University Grades," School Review, XXXII (March 1924), pp. 182-192.

165. Segal, David, "Differential Prediction of Scholastic Success," School and Society, XXXIX (January 1934), pp. 91-96.

166. Segal, David, "Prediction of Success in Junior College," Junior College Journal, I (May 1931), pp. 499-502.

167. Seyler, E. C. "The Value of Rank in High School Graduating Class for Predicting Freshmen Scholarship," Journal of American Association of College Registrars, XV (October 1939), pp. 5-22.

168. Shaffner, Martha, "The Effect of Part-Time Employment on the Scholarship Ratings of College Students," School and Society, L (October 1939), pp. 541-542.

169. Smith, Francis F. "The Use of Previous Record in Estimating College Success," Journal of Educational Psychology, XXXVI (March 1945), pp. 167-176.

170. Stagner, Ross, "The Relation of Personality to Academic Aptitude and Achievement," Journal of Educational Research, XXVI (May 1933), pp. 648-660.

171. Stalnaker, Elizabeth M. "A Four-Year Study of the Freshman Class of 1935 at

West Virginia University," Journal of Educational Research, XXXIX (October 1945), pp. 81-101.

172. Stalnaker, Elizabeth M. and Remmers, H. H. "What Kind of High Schools Contribute to College Failure?" Bulletin of Purdue University, XXX (1930), p. 39.

173. Templeton, W. D. "Vocabulary and Success in College," Journal of Higher Education, XIII (April 1921), pp. 481-494.

174. Thisted, M. N. and Jones, Lonzi. "Critical Analysis of the Personal Information Blank in Use at the State University of Iowa," School and Society, XXXIII (April 1931), pp. 540-544.

175. Thompson, R. B. and Fletcher, M. A. "Comparative Academic Records of Veterans and Civilian Students," American Association of College Registrars, XXII (January 1947), pp. 176-179.

176. Thorndike, E. L. "On the New Plan of Admitting Students of Columbia University," Journal of Educational Research, IV (September 1921), pp. 95-101.

177. Thorndike, E. L. "The Future of the College Entrance Examination Board," Educational Review, XXI (May 1905), pp. 470-483.

178. Toops, H. S. "The Status of University Intelligence Tests in 1923-24." Journal of Educational Psychology, XVII (January, February, 1926), pp. 23-36.

179. Tribilcock, W. E. "Many of the 'Lowest Third' of Our Graduates are College Material," Clearing House, XII (May 1938), pp. 544-546.

180. Van Wagenen, M. J. "Some Results and Inferences Derived from the Use of the Army Tests at the University of Minnesota," Journal of Applied Psychology, IV (March 1920), pp. 59-72.

181. Vaughan, W. H. "Are Academic Subjects in High School the Most Desirable Preparation for College Entrance?" Peabody Journal of Education, XXV (September 1947), pp. 94-99.

182. Votaw, David F. "A Comparison of Test Scores of Entering College Freshmen as an Instrument for Predicting Subsequent Scholarship," Journal of Educational Research, XL (November 1946), pp. 215-218.

183. Weber, C. O. "Comparative Values of College Entrance Examinations," School and Society, LV (February 1942), pp. 247-251.

184. Weber, C. O. "Old and New College Board Scores and Grades of College Freshmen," Journal of American Association of College Registrars, XX (October 1944), pp. 70-75.

185. Weaver, L. J. and Stoke, S. M. "New CEEB Examinations," Journal of Higher Education, XVI (January 1945), pp. 37-38.

186. Whitney, S. M. "Psychological Test Ratings and College Entrance Age," School and Society, XXIV (January 1926), pp. 370-372.

187. Whitney, F. L. and Leuenberger, H. W. "The College Success and Mortality of State Teachers College Freshmen as Related to Intelligence and High School Achievement," Educational Administration and Supervision, XVI (1930), pp. 668-672.

188. Whitman, A. D. "The Selective Values of the Examinations of the College Entrance Examination Board," School and Society, XXV (April 1927), pp. 522-524.

189. Williamson, E. G. "The Significance for Educational Guidance of Personal Histories," School Review, XLIV (January 1936), pp. 41-49.

190. Williamson, Edmund G. and Freeman, E. M. "University of Minnesota Studies in Predicting Scholastic Achievement, Part I," University of Minnesota Press (1942).

191. Wilson, M. O. "The Intelligence and Educational Achievement of Two Hundred Fifty Freshmen Women of the University of Oklahoma," School and Society, XXI (June 1925), pp. 693-694.

192. Wood, B. D. "The College Curriculum and Vocational Guidance," School and Society, XXI (April 1925), pp. 508-512.

193. Wrenn, C. Gilbert and Crandall, E. B. "Behavior Ratings and Scholarship Among College Freshmen," Journal of Educational Research, XXXIV (December 1940), pp. 259-264.

194. Zalmon, W. R. "Relationship of Traits of the Bernreuter Personality Inventory to Academic Success," American Association of College Registrars, XXI (October 1945), pp. 81-84.

THE CONSTRUCTION OF A DIAGNOSTIC TEST OF LISTENING COMPREHENSION

JAMES I. BROWN
University of Minnesota
St. Paul, Minnesota

INTRODUCTION

Importance of listening comprehension.--A democracy is based on the ability of its citizens to think and act intelligently. Since accurate complete information is basic to sound thinking, reading and listening, the two language channels through which information is received, hold positions of paramount importance.

While reading, perhaps, more than any other school subject has been the object of scientific study and investigation, listening has been almost completely neglected. If the average individual depended less upon listening than upon reading, there might be reason for this neglect. But such is not the case, judging from Rankin's[1] study, which indicates that listening is the most frequently used language activity, the average adult spending approximately three times as much time listening as reading.

Recently the belief[2] has arisen that listening can and should be taught, that the development of listening skill, like the development of other skills, is a matter of training.

Need for a test of listening comprehension.--This growing awareness of the importance of listening has brought with it an increasing need for a measure of listening ability. Up to the present a preponderance of the publications on listening have been expressions of theory. As recently as last year, Nichols[3] found only fourteen scientific studies relating to classroom listening among the seventy-one references on listening in his bibliography. Goldstein[4] somewhat earlier found and reviewed only twelve such studies.

And even among the relatively few research studies in this field there is little agreement in the findings. For example, Goldstein's summary of the literature reveals that three studies favor an auditory and three a visual presentation. Another study points to a reversal of superiority between the fifth and ninth grades, the visual mode becoming superior as the student progresses in school. Another study finds the auditory mode superior among college students, the visual for non-college adults. Still another study shows the visual mode superior in college for rapid readers, the auditory superior for slow readers.

Such contradictory findings are the apparent result of failure to use adequate controls and accurate measuring instruments. Accurate experimental results are not possible with inaccurate measuring instruments, yet in previous studies of listening the test instrument has received only incidental attention. The Third Mental Measurements Yearbook (1949) has seventy pages devoted to describing and evaluating available tests in the field of reading, but no reference to any listening test. Such a test is needed.

Previous research.--From the twenty-five previous studies of listening reviewed for this study, the following conclusions may be drawn, relative to listening tests and the listening process:

1. The test instrument has received insufficient attention. In all but one study, the construction of an appropriate test was a secondary or incidental matter. In four studies silent reading tests were used with little or no modification to measure listening comprehension. In only two studies was there sufficient concern over the test instrument to lead to an item analysis. Mention of test reliability was made in only nine studies and in none of the studies was test validity a matter of particular concern, further evidence of the perfunctory attention to the test instrument.

2. The variables of reading, intelligence, difficulty, and interest seem to be of sufficient im-

1. Paul T. Rankin, "Listening Ability: Its Importance, Measurement, and Development," Chicago Schools Journal, XII (January 1930), 177-179.

2. See James I. Brown, "Why not Teach Listening?" School and Society (February 1949), 113-116. Also Ralph G. Nichols, "Teaching of Listening," Chicago Schools Journal (June 1949), 273-278.

3. Ralph G. Nichols, "Factors in Listening Comprehension," Speech Monographs, XV (1948), 154-163.

4. Harry Goldstein, Reading and Listening Comprehension at Various Controlled Rates, Contribution to Education, No. 821 (New York: Teachers College, Columbia University, 1940), 2-5.

portance to merit careful control. Within limits, the variables of speaker, rate of delivery, and audibility seem to be of less importance.

3. There is little agreement on a definition of listening.

Purpose.--The present study was, therefore, an attempt to meet the basic need for a reliable research instrument. Teachers of English or Communication should find such a test useful in helping them discover specific student needs upon which to plan suitable listening course units. Counselors and advisors should find such a test helpful in predicting academic success or suggesting proper study techniques.

More specifically, the primary purpose was to develop suitable measuring techniques for use in diagnosing listening comprehension skills among students at the senior high school and college levels. By listening comprehension is meant the aural assimilation of spoken symbols in a face to face speaker-audience situation, with both oral and visual cues present. Listening comprehension assumes the ability to hear, but hearing and listening are not to be considered synonymous. The medical doctor's concern is with hearing; the instructor's concern is with listening. The secondary purpose was to discover such information about the listening process as would be helpful in the evaluation of the test instrument and could be obtained from the use of experimental tests incorporating the newly-developed measuring techniques.

PROCEDURE

Selection of factors to be measured.--Based on the hypothesis that listening, as reading, is a composite of several relatively independent skills, listening was defined for test purposes in terms of both accurate and critical listening.

Accuracy of receiption was directly explored in terms of (1) getting the lecture details; (2) following a sequence of details in the form of oral directions; and (3) keeping a series of details in mind until questioned. Reflective listening was directly explored in terms of (1) getting the central ideas; (2) drawing inferences; (3) distinguishing relevant from irrelevant materials; (4) using contextual clues to word meanings; and (5) using transitional elements. Two other measures were derived, a measure of impressionability and a measure of rationalization.

These factors were selected on the basis of (1) recent pronouncements of the Commission on the English Curriculum of the National Council of Teachers of English, (2) conclusions reached by Nichols in his survey study of factors in listening comprehension, (3) diagnostic tests in the field of silent reading, and (4) the opinion of experts, chosen largely from among the members of the Vertical Committee on Listening of the National Council of Teachers of English.

For example, the two-fold division into reception and reflection, with emphasis on reflection, was suggested by the pronouncements of the Commission on the English Curriculum. Eleven of the fourteen factors which, according to Nichols, seemed to influence listening most definitely were included for further study. Inspection of diagnostic reading tests and a recognition of the fact that such tests are often criticised for their unnaturalness and lack of continuity led to the construction of both a relatively artificial and relatively natural listening test form.

One form was as close to a normal classroom lecture situation as possible without losing the objectivity of a controlled script. After the lecture the students were questioned about (1) the details, (2) the central ideas, (3) inferences, and (4) relevancy. The other form was planned to explore the possibility of measuring those skills by less time-consuming methods, by chancing upon closely related factors that might permit the prediction of one skill from another. After a brief orientation section which was to furnish a rationalizing index, this form measured the ability (1) to follow a sequence of details, (2) to remember a sequence of details until questioned, (3) to use contextual clues, and (4) to use transitional elements. The concluding part was an impressionability index.

As a final check on the probable importance of the factors chosen for measurement, a jury of eleven experts rated them on a five-point scale, from "very important" to "very unimportant." All factors were rated "very important" by at least two experts and one factor "very important" by all experts. There was only one rating on the unimportant side of the scale, a "moderately unimportant" rating.

Construction of the two sections of the test.--After some initial tentative explorations, items of an apparently satisfactory nature were developed for all factors selected for measurement. By expanding the number of items in each category which had worked out most satisfactorily, two complete test sections were constructed.

Section I, Part 1. Orientation. The first five items in this part furnished necessary instructions for taking the test as well as information for subsequent use in a follow-up interview. The next sixteen items furnished a strength of opinion or rationalizing index. Students were asked to rate controversial statements on a five-point scale, from "strong agreement" to "strong disagreement" with a middle rating of "undecided." Theoretically, the more strongly opinionated the individual, the greater the tendency to rationalize.

Part 2. Oral Directions. The items in this part contained a sequence of details in the commonly met form of oral directions, each of which had to be translated into action before going on to the next.

Part 3. Thinking Back. This part was similar to the preceding one, but it was thought that even slight differences might be of importance. Items in this part contained a sequence of details which

had to be kept in mind until a question was asked that required thinking back over the sequence.

Part 4. Contextual Clues. This part measured the ability to use sentence contexts as clues to word meanings. This seemed basic to all listening, for most words have more than one meaning and it is continually necessary to use the context to get the intended meanings. Half of the words in this part were very common, the others quite difficult. Multiple choice items were constructed with five correct dictionary definitions for each of the simple words and the usual type of vocabulary items for the difficult words.

Part 5. Transitional Elements. It was thought that awareness of transitional words and phrases might relate closely to such things as getting the central ideas or following the plan of organization. Sentences with a transitional function were adapted from several different sources. Students were to indicate whether the sentence suggested the (1) beginning of a discussion, (2) going from one point to another, (3) concluding of a discussion, or (4) none of those.

Part 6. Strength of Opinion. Actually this was measured in Part 1. Part 6 was intended to measure impressionability or susceptibility to suggestion. The same sixteen items that appeared in Part 1 were repeated with the addition of an emotionally colored word of approval or disparagement. Shifts in rating were noted.

Section II. This section began with a fifteen minute lecture, the lecture material coming from a source of known interest and difficulty, the Reader's Digest. Portions of twelve articles were organized into a lecture and given unity and coherence by use of transitional sentences.

Part 1. Getting the Details. Approximately seven of the important details from each of the lecture were included in this part, the wording being as near to the original lecture wording as possible.

Part 2. Getting the Central Ideas. Here the specific wording of the lecture was avoided, the students being asked to give the central idea of the entire lecture, of the three major divisions, and of the various subdivisions.

Part 3. Depth of Understanding. This was measured by having the students go beyond the details and central ideas to draw reasonable inferences from what was heard.

Part 4. Judging Relevancy. In this part, students were asked which parts of the lecture or which statements about the lecture were more relevant. The central idea of the entire lecture was the criterion.

Preliminary and final administrations.--These two sections were administered in part or entirely to a varied group of subjects, ranging from high school juniors to doctoral candidates and in age from sixteen to thirty-one. On the basis of these data and individual criticisms, revisions were made in both items and directions. This revised form was then administered to a University freshman English class of twenty-three. Objective and subjective data were collected on timing, clarity of directions, difficulty, and interest. A complete item analysis was made to eliminate non-functioning items. Individual test profiles were then made to check subtest relationships. After a final revision both sections of the test were administered to a high school junior class and a sampling of college freshmen. Complete data for the final analysis were obtained from 110 high school and 150 college students.

ANALYSIS OF THE DATA

Test validity. Two different approaches, a negative and a positive, were used in the attempt to establish test validity. Negatively speaking, three major possibilities were examined: (1) that the test was actually an oral test of intelligence, (2) that it was actually a test of comprehension, there being no essential difference between reading and listening comprehension, and (3) that it was actually a measure of scholastic achievement.

The correlation between the two sections of the listening test and the California Test of Mental Maturity, a test heavily weighted with non-reading type items (.78 and .67), was found to be no higher than that between silent reading tests and intelligence tests heavily weighted with reading-type items. The correlation between sections of the listening test and an intelligence test such as the ACE was .37 and .29. The correlation with the Nelson-Denny Test of Silent Reading was .31 and .36, and with scholastic achievement as measured by high school rank, .28 and .21. The listening test does not appear to be a measure of intelligence, silent reading comprehension, or scholastic achievement, although the relationship to intelligence is one that seems to need further investigation.

Positive efforts were made to check validity (1) by definition, (2) by subtest inter-relationships, and (3) by subtest consistency. After the experts had expressed belief in the importance of such factors as the ability to follow a sequence of details, subtests were constructed in accordance with those defined factors. As a statistical check to see whether or not the different subtests were actually measuring different factors, inter-correlations were computed between all the subtests and section totals. Table I shows those inter-correlations, the computations being based on both the high school and college subjects (N = 260).

Apparently, quite different skills are being measured by the different subtests, a fact which tends to confirm the judgment of the experts. As a final statistical check, each subtest was analysed for internal consistency, to see what extent each item in a subtest was measuring what the whole subtest measured. This was

TABLE I

SUBTEST AND SECTION-TOTAL INTER-CORRELATIONS

	Section I						Section II				
	#2	#3	#4	#5	#6	(#2-5) Total	#1	#2	#3	#4	(#1-4) Total
Sec. I											
1	-.0745	-.0229	-.1907	-.1659	-.0037	-.1592	-.1589	-.2698	-.3146	-.1343	-.3324
2		.3070	.3839	.3135	-.1769	.7394	.2723	.3328	.2944	.1784	.3653
3			.2855	.1885	-.1630	.6266	.1311	.1580	.0807	.0529	.1244
4				.4566	-.1838	.7420	.5576	.3865	.4107	.2065	.5216
5					-.1955	.6953	.3684	.4054	.3641	.2396	.4627
6						-.2562	-.1974	-.0506	-.1082	-.1977	-.1793
Total (#2-5)							.4675	.4576	.4092	.2421	.5238
Sec. II											
1								.3932	.3972	.2849	.6279
2									.4005	.2828	.6061
3										.1769	.8865
4											.5088

done in terms of the coefficient of correlation between the item and the subtest total in which that item appeared.

The item analysis was based on a method developed by Flanagan[5], the coefficient taken as the index of validity being read from a table showing "the values of the product moment coefficient of correlation in a normal bivariate population corresponding to given proportions of successes in the upper and lower twenty-seven percent of the criterion groups."

A separate analysis was made both the high school and college groups. Table II shows the average item validity for the subtests.

Special treatment of Parts 1 and 6, Section I.--Because there were no "correct" answers in these parts, a different type of analysis was used. These sections were scored so that thé more extreme the agreement or disagreement or the more changes the higher the score. Generally speaking, good listeners tended to be less uncertain and less positive in their opinions as well as less likely to change their opinions. The low correlations with other subtests are evidence that these characteristics are not closely related to listening skill.

Test reliability.--Reliabilities were calculated by the split-half method and estimated for each full subtest by the Spearman-Brown formula. Table III contains the reliability coefficients for each subtest and section total in each group.

In a test of this kind additional factors may operate to reduce reliability. For example, there is no opportunity, as in reading-type tests, to go over any item twice. Loud coughs, the dropping of a pencil, or any such momentary distractions would tend to reduce reliability, more so than in a reading-type test where it is possible to go back and re-read after a distraction. And listening may by its very nature, be characterized by lapses of attention, more so than the companion skill of reading. An inspection of about fifty individual scores on one part suggests that as a probability.

Appropriateness of the test for high school and college use.--This was explored in terms of difficulty, interest, and clarity.

In terms of the generally accepted standard of fifty percent average difficulty for the test or a range of average difficulty between forty and sixty percent, the listening test was somewhat too easy for the particular groups tested. Omitting Parts 1 and 6 for which there were no "correct" answers, of the remaining eight parts four for the high school group and two for the college group came within that range. The average difficulty for both sections of the test was sixty percent for the high school and sixty-two percent for the college group. A majority of the subtests exhibited a range of item difficulty of over sixty percent and few students made a perfect score in either group on any subtest, some subtests being so difficult that only one or two items were answered correctly.

In only three of the eight subtests was the difference in means between the high school and college group statistically significant. Means for both section totals were not significantly different.

Interest.--High school students in all but two classes were asked to rate the test as to interest. Eighty-five percent said the listening test was more interesting than other tests, the two sections being almost exactly balanced in interest appeal. Section I was considered more interesting by fifty percent and Section II by forty-nine percent (one percent were undecided). This should also be thought of as evidence of a functional validity.

Clarity.--Seventy-five percent of the students questioned said that the test directions were perfectly clear. Directions for Part 5 were the only ones to give some trouble, and only twelve percent of the students mentioned having some difficulty.

The appropriateness of the administrations.--Timing was checked both objectively and subjectively. A strong majority said that the timing was "just right", neither "too slow" nor "too fast". There was close agreement between the subjective ratings and objective data on timing. Audibility and individual hearing defects were also checked, but test results were apparently not influenced noticeably by these factors in either group.

CONCLUSIONS

Generally speaking, the test appeared to be a reasonably valid and reliable measure of certain specific factors in listening comprehension, appropriate after some slight revisions for use at both the high school and college levels.

More specifically, the evidence collected within the particular framework of this study leads to the following conclusions about the test instrument and the process of listening. A distinction is made between the two test sections, Section I being considered the more artificial listening situation and Section II the more natural listening situation.

The test instrument

(1) The test instrument seems to be measuring something different from intelligence, read-

5. John C. Flanagan, "General Considerations in the Selection of Test Items and a Short Method of Estimating the Product-Moment Coefficient from Data at the Tails of the Distribution," Journal of Educational Psychology, XXX (December 1939), 674-680.

TABLE II

AVERAGE ITEM VALIDITY* (PEARSON PRODUCT-MOMENT r) OF SUBTESTS IN LISTENING TEST

Subtests	Average Item Validity	
	High School Juniors	College Freshmen
Sec. I: #2	.50	.57
#3	.53	.48
#4	.42	.52
#5	.49	.60
Sec. II: #1	.40	.46
#2	.38	.39
#3	.31	.43
#4	.34	.36

*Obtained by averaging values of z for r.

TABLE III

ESTIMATED RELIABILITIES FOR SUBTESTS AND SECTION TOTALS FOR BOTH GROUPS

Test Parts	High School	College
Sec. I: #2	.8372	.7636
#3	.5950	.7470
#4	.7287	.5377
#5	.7795	.4893
Total	.8915	.8106
Sec. II: #1	.7083	.5844
#2	.4643	.4557
#3	.7985	.5853
#4	.5214	.2374
Total	.8748	.6472

ing comprehension, or scholastic achievement.

(2) The more natural the measure of listening comprehension, the closer the relationship to reading comprehension.

(3) The more natural the measure of listening, the less close the relationship to intelligence and scholastic achievement.

(4) The different subtests appear to be measuring different factors.

(5) Almost every item in all the subtests appears to be a sufficiently consistent measure of what each subtest measures.

(6) The test is slightly too easy for both groups tested.

(7) Almost all the subtests are sufficiently reliable for use in making group diagnoses.

(8) While none of the subtests or section totals meet Kelley's rigorous standard of a reliability of .94, actually not too many published tests come up to that standard.

(9) The range of item difficulty within each subtest is sufficiently extensive.

(10) Subjective evidence indicates that the test is more interesting than other tests and that students were motivated to genuine effort.

(11) Subjective evidence indicates that for most students the timing and audibility were satisfactory and the directions perfectly clear.

The inter-relationship between Section I and Section II

(1) Strength of opinion or rationalizing seems to interfere most with drawing inferences or getting central ideas.

(2) Following oral directions or a sequence of details seems most closely related to getting the central ideas.

(3) Thinking back or remembering seems most closely related to getting the central ideas.

(4) Using contextual clues seems most closely related to getting lecture details.

(5) Noting transitional elements seems most closely related to getting central ideas.

(6) Susceptibility to emotionally loaded words seems to interfere most with the judging of relevancy.

(7) Subtests in Section I are not closely enough related to the subtests in Section II to permit very reliable predictions. All the subtests appear to be measuring dissimilar rather than similar skills.

(8) The best single subtest for use in screening good from poor listeners appears to be the one on using contextual clues, which correlates .74 with the total score on Section I and .52 with the total score on Section II.

It was hoped that Section I might provide less time-consuming techniques for measuring factors of importance in general listening comprehension. Instead a different relationship was suggested. For example, if getting the central ideas is an aspect of listening, noting transitional elements appears to be a subordinate, not a parallel aspect of listening.

The following device may clarify this point:

(1)	(2)	(3)
Listening ----	Getting Central Ideas	---- Noting Transitional Elements
?	Noting Transitional Elements	? Following a Sequence of Details

In other words, the ten factors which the test is designed to measure may not all belong in the second grouping. Some may belong in the third grouping as sub-factors of factors in the second grouping. It would seem reasonable, for example, to suppose that noting transitional elements might be related to getting the central ideas, a supposition strengthened by the relatively high correlation between the two subtests. This matter deserves further study.

The listening process

(1) Listening ability seems to depend on something besides intelligence, the more natural the listening situation the less close the relationship to intelligence.

(2) Listening comprehension seems to be different from reading comprehension, although the more natural the listening situation the closer the relationship to reading ability.

(3) Listening comprehension seems to be different from scholastic achievement: the more natural the listening situation the less close the relationship to scholastic achievement.

(4) Listening is a complex skill.

(5) Holding strong opinions or being uncertain tend to interfere with effective listening.

(6) Susceptibility to suggestion tends to interfere with effective listening.

(7) Listening ability does not seem to improve significantly without special attention from the senior high school to the college level.

(8) There is some evidence that the listening process is characterized by lapses of attention, the number and duration varying with the individual.

Suggestions for further study.--The use of such a test as this in remedial or developmental reading programs deserves study. This test may provide a non-reading language comprehension score which, when compared with scores on silent reading tests, would reveal reading difficulties better than a reading-type intelligence test.

There are innumerable possibilities to be explored under the heading of guidance and counseling. The relationship between listening comprehension and scholastic achievement deserves more careful study. There may be certain courses or educational fields in high school or college where listening is of major importance.

There may be close relationships existing between listening comprehension and vocational success in some fields. The test might be a useful addition to a college entrance battery.

Further explorations of the listening process might be carried on,--studies of listening efficiency when notes are and are not taken, studies in directed listening where students are specifically told what to listen for (details, central idea, etc.), studies of the all-important problem of whether or not listening can be taught and what particular skills are most amenable to training, and studies of the closely related problems of how listening can best be taught and at what levels.

UTILIZATION OF CENSUS DATA IN STATISTICAL ANALYSIS OF SCHOOL DROP-OUT PROBLEMS

WILLIAM L. GRAGG
Ithaca Public Schools
Ithaca, New York

Census Publications

The sixteenth census of the United States (1940) includes data concerning the educational attainment of the population, as measured by the highest grade of school completed. A number of special studies derived from the information on education have been released during the period subsequent to the initial publication of the sixteenth census. A report published in 1945 presents statistics showing the relationship between the economic status of the family, as measured by monthly rental value of the home, and educational attainment.[1] A later report presents statistics showing the relationship between educational attainment, as measured by the highest grade of school completed, and subsequent social-economic status, as indicated by tenure and rental value of the home, employment status, major occupation group, wage or salary income in 1939, and marital status.[2] Both studies are based on five percent samples of the population returns for native white and Negro persons; the first deals with children seven to seventeen years old and the latter with adults, 18 to 60 years old.

The Problem

One may deduce, through perusal of the publications cited above, that a close relationship exists between the educational attainment of adults and such factors as quality of housing, occupational level, and income. Does a relationship exist between educational attainment of adults and the educational attainment of their children? In this study the object is not to analyze the various levels of educational attainment but to determine the relationship of a single criterion to other factors -- attainment or non-attainment of high school graduation. Actually, the latter dichotomy is a part of the larger category, simplified to reveal relationships between various factors and the characteristics of youth who completed and those who failed to complete four years of high school.

Carrying the analysis further, can relationships be shown between graduation from high school and certain socio-economic factors for which relationships have been established for adults? Specifically, are there significant differences between graduates and drop-outs with respect to the rental value of their homes, the educational attainment of their parents, the state of repair of their homes, degree of overcrowding in the homes, the existence of central heating and refrigeration in the homes, the extent of unemployment in the neighborhood, or the composition of the neighborhood with respect to racial background?

Material of the Study

The school records of the pupils included in this study do not contain the facts needed to answer these questions. It is not likely that information of the type gathered in the census is available to schools, particularly that information which deals with income, housing conditions, and the rental value of homes. The absence of data obtained directly from school records does not, however, preclude the establishment of analytical procedures for determining relationships between elimination and certain socio-economic factors in a given geographic area.

Special statistical reports have been published by the Bureau of the Census for sixty cities in the United States; New Haven, Connecticut, is one of these cities. The report for New Haven includes tables showing (1) the population by race and nativity, and occupied dwelling units; (2) age, race, and sex; (3) years of school completed, employment status, class of worker, major occupation group, country of birth, and citizenship, by sex; (4) dwelling units by occupancy status and race of occupants; (5) value of owner-occupied dwelling units, contract or estimated rent of all dwelling units, and gross rent of tenant-occupied units; (6) type of structure, state of repair and

1. U. S. Department of Commerce, Bureau of the Census. Educational Attainment of Children by Rental Value of Home (Washington, D. C.: Government Printing Office, 1945), 50 pp.

2. U. S. Department of Commerce, Bureau of the Census. Educational Attainment by Economic Characteristics and Marital Status (Washington, D. C.: Government Printing Office, 1947), 226 pp.

plumbing equipment, size of household, persons per room, radio, refrigeration, and heating equipment. All of this information is tabulated by census tracts.[3]

The city of New Haven contains 33 census tracts, all of which are contiguous with the boundaries of the 33 wards of the city. Each tract contains a total population of between two thousand and nine thousand; the average for all tracts is 4867. Tracts are greater in size in the more sparcely inhabited areas of the city. All of them are relatively compact and uniform in shape. On inspection, the characteristics of the homes in any one tract appear to be relatively homogeneous, although there is considerable difference in the quality of housing in different tracts. Likewise, there is a tendency for persons to congregate into rather well defined areas with respect to ethnic characteristics. Wards 10, 11, and 12 are Italian neighborhoods; wards 19 and 22 are predominately occupied by Negroes; ward 30 is a restricted high-cost area inhabited by families in the higher-income "old-family" white group.

The Method and Procedure

These analyses of New Haven census tract data are based on the hypothesis that each tract is relatively homogeneous with respect to various social and economic factors. This can be interpreted, for example, to mean that the average rental value of all dwellings in tract 10 fall within a range that differs but slightly from the median rental value of all homes in tract 10. The hypothesis is put into operation with the assumption, first, that the homogeneity of characteristics of any given census tract can be applied to specific samples derived therefrom, and, second, that the graduates and drop-outs included in this study who live in the various census tracts possess characteristics which are representative of the median for the tract in which they live.

An index of pupil mortality for each tract has been devised by computing the ratio between the number of high school graduates and the number of drop-outs living in each census tract. The index for a tract containing fifteen graduates and five drop-outs is 3.0; the index for a tract containing six graduates and eight drop-outs is 0.75.

In order to provide a statistical measure of the relationship between the proportion of graduates and drop-outs in the various census tracts and certain other factors, correlation coefficients are obtained. This study utilizes the product-moment method of correlation without deviations:

$$r = \frac{\Sigma XY - AX \cdot \Sigma Y}{\sqrt{\Sigma X^2 - AX \cdot \Sigma X}\ \sqrt{\Sigma Y^2 - AY \cdot \Sigma Y}}$$

in which X represents the ratio of graduates to drop-outs, and Y represents the factor measured for relationship to X.

If we assume that a relationship exists between the population of each ward and the ratio of graduates to drop-outs, we should be able to determine a correlative measure of this relationship. The product-moment correlation between the percentage of total population of the city living in each ward and the ratio of graduates to drop-outs in each ward is -.01. It is apparent from the value of r that no such relationship exists.

The computed value of r for each of the distributions of census data is presented in Table I below; in each instance the x factor is the ratio of graduates to drop-outs within the school year 1945-46 living in the respective census tracts of the city of New Haven.

Findings

United States census data on housing show the rental value of occupied dwellings. This figure is the actual monthly rent for tenant-occupied dwellings, and one percent of the total value of owner-occupied dwellings. Statistically, the correlation between graduates and rental value is higher than the correlation between graduates and any other factor considered in the New Haven study. While it may not be accurate to assume that there is a direct casual relationship between the value of a home and school elimination, rental value is an excellent index of certain factors which reflect the home environment of boys and girls.

If the actual rental values of the homes of graduates and drop-outs involved in this study were determined, it is highly probable that the correlation between the two factors would be more significant than that indicated for the median rental value of all homes in each ward.

The product-moment correlation between the rate of graduation and the percentage of the adult population in each ward whom completed four years of high school is .62. The r for the rate of graduation to median school years completed is .56. Both of these measures are significant with respect to the prediction of graduates and drop-outs. The data for completion of high school possess a small but significant advantage in predictive analysis over the data for median school years completed.

---

3. U. S. Department of Commerce, Bureau of the Census. Population and Housing, Statistics for Census Tracts, New Haven, Connecticut (Washington, D. C.: Government Printing Office, 1942), 20 pp.

TABLE I

VALUE OF r FOR ELEMENTS CORRELATED WITH RATIO OF GRADUATES TO DROP-OUTS IN 33 CENSUS TRACTS, NEW HAVEN, 1946

Element	Value of r
1. Distribution of population in percentage of city total	-.01
2. Rental value of all occupied homes	.70
3. Educational attainment in terms of percentage of adult population who completed four years of high school	.62
4. Educational attainment in terms of median number of school years completed	.56
5. Median age of the population	.36
6. Median number of persons per household	.01
7. Percentage of dwelling units needing major repairs	-.26
8. Percentage of dwelling units with 1.5 or more persons per room	-.29
9. Percentage of dwelling units with no refrigeration	-.36
10. Percentage of population having completed no years of formal schooling	-.38
11. Percentage of foreign-born white population	-.38
12. Percentage of dwelling units without central heating	-.46
13. Percentage of workers seeking work	-.47

The median age of the population of wards is related to the rate of graduation of high school pupils. The product-moment correlation between rate of graduation and the median age of the population of each ward is .36. It is apparent that youth living in areas where families are relatively older are more likely to graduate from high school than youth who live in areas where families are relatively young; this may or may not indicate a tendency for youth in large families to drop out of school more readily than youth in small families.

Data which represent the numbers of persons in a dwelling unit may be assumed to correspond, in some degree, to the size of the family. Some research findings in the literature propose that a relationship exists between elimination and the size of the family. The data employed in this study, however, do not reveal such a relationship. The r for median number of persons per household to rate of graduation is .01. This figure indicates that no relationship exists between the number of people living in homes and probability of graduation from high school. This conclusion, however, does not take into consideration extenuating factors which are not revealed by the employment of ward medians. The proposition should be tested further on the basis of the size of the families of pupils themselves.

One of the measures of housing conditions included in 1940 census reports is the state of repair on such parts of dwellings as floors, roof, plaster, walls, or foundations, the continued neglect of which would impair the soundness of the structure and create a hazard to its safety as a place of residence. A limitation on the utilization of such data must be considered. The facts compiled by enumerators are, in the case of small areas, subject to a wider margin of error than is to be expected for larger areas. This qualification applies particularly to classifications involving complex definitions which require some judgment on the part of enumerators, such as the question on the need of major repairs. The misinterpretation by an enumerator of instructions pertaining to a particular item may cause a significant bias in the statistics for a very small area.[4]

Despite the possible statistical bias in the information concerning the state of repair of dwellings, the facts obtained in this study indicate that there is a relationship between dropping out and homes needing repair. Those areas in the city having the lowest percentage of dwelling units needing major repairs are likewise areas with a low ratio of dropping out of school. Those wards having the highest percentages of dwellings needing repairs are areas with a high drop-out rate. The relatively low correlation figure (r = .26) may be attributed, in part, to the difficulty of obtaining data on state of repair with complete accuracy.

It is significant to note that the four wards having the smallest proportion of over-crowded homes are among the six wards having the lowest proportion of drop-out. Unlike the figures above dealing with the size of family units, the data on percentages of homes having 1.5 or more persons per room indicate some relationship between the rate of graduation and the proportion of over-crowded homes in the census tracts. Over-crowding probably is an index of conditions which produce drop-outs.

The product-moment correlation between rate of graduation and the lack of refrigeration equipment in the home is -.36. In positive terms, the presence of refrigerators in homes is more prevalent among the families of graduates than among the families of drop-outs. The relatively low proportion of dwellings lacking refrigeration tends to render the use of this factor as an index of dropping out somewhat limited in usefulness. In a similar manner, the distribution of radios and telephones present a difficulty in statistical sampling; these items have become so common that the portion of the population not possessing them is too small to provide ample data for setting up a dichotomy.

The data for educational attainment of the population include the number of persons 25 years of age and over who have not completed one year of school. Although there is no basis, from the facts given, to designate this item as a measure of illiteracy, it is fairly representative. There is a relationship between the lack of schooling of adults and the drop-out rate in each ward of the city. It should be noted, further, that the data for percentages of the population with no schooling are inversely related to the data for percentages of the adult population who completed four years of high school and the median number of school years completed by all adults in each ward. The employment of data about lack of schooling does not produce as sharp a picture of the relationship of parents' education and school mortality as does the use of information about the number of school years completed or the fact of graduation from high school. If only one measure is desired, that dealing with completion of high school should be employed.

Although the percentage of foreign-born pupils in school in New Haven is too small to have statistical significance in the analysis of drop-outs, the racial stock of parents is sufficiently diverse to warrant investigation of any relationships which may exist between racial background and other factors. A negative relationship exists between the rate of graduation and the percentage of foreign-born white population in each ward in the city. (r = -.38). Considerable caution

4. U. S. Department of Commerce, Bureau of the Census. Statistics for Census Tracts: New Haven, Connecticut (Washington, D. C.: Government Printing Office, 1942), p. 3.

should be exercised in employing data on racial stock for statistical analysis. Observation of the data gathered for this study indicates that considerable variation exists, not only among different nationalities but within a given group, with respect to persistence in school.

There is a rather high degree of association between areas without central heating and drop-outs. The product-moment correlation between the rate of graduation and the percentage of dwelling units without central heating in each ward is -.46. Because there is wide dispersion in the percentages of homes without central heating in different neighborhoods and because this fact should be relatively easy to ascertain, it should prove a useful tool for the prediction of elimination.

Areas in which unemployment was prevalent in 1940 are the same areas in which the drop-out rate was high in 1946. This relationship is interesting in that it does not depend on data describing the immediate situation with respect to the labor market. On the other hand, unemployment may be regarded as a symptom of social and economic ills which have their effect on the probability that boys and girls will graduate from high school. Employment status of parents is a fact available to the school administrator. Knowledge of a relatively high incidence of unemployment in some families should be a signal to school personnel to be alert to difficulties among pupils in such families. The likelihood that a pupil whose father is unemployed will graduate from high school is much smaller than that of the pupil whose father is regularly employed.

Summary

1. United States Census reports constitute a valuable source of materials to be used in statistical analysis of problems in education.
2. In a study of factors associated with dropping out of school in New Haven, Connecticut, census data for that city were instrumental in providing information not readily available through other sources.
3. Factors associated with dropping out of school can be measured statistically by utilizing data for census tracts in cities. Twelve such factors were employed successfully in analyzing the drop-out rate in New Haven.
4. Those factors which characterize drop-outs, in contrast with graduates, are (a) living in low-rent areas; (b) low educational attainment of adults in the neighborhood in terms of the number of adults who completed four years of high school and in terms of the median number of school years completed by adults; (c) lack of central heating in dwellings; and (d) a high incidence of unemployment among workers in the neighborhood.
5. To a lesser degree, there appears to be a relationship between dropping out and (a) young population groups as measured by the median age of the population; (b) dwelling units needing major repairs; (c) lack of refrigeration equipment in homes; (d) illiteracy and (e) high proportion of foreign-born white residents.

In view of the fact that the Seventeenth Census of the United States will be undertaken in 1950, educators and students should look forward to potential sources of research data which can serve to expedite the solution of problems in education. The study outlined above is but a minute example of the possible uses to which census statistics can be put.

IS CONCENTRATED STUDY PROFITABLE?

ALICE TURLEY and HARDEMAN CROWE
Eureka Public Schools
Eureka, Missouri

In the army's attempt to meet the demands for speedy delivery of trained personnel, a course of intensive training was adopted. Some proponents of this system claim it to be superior to the traditional method used in the educational field, but whether such a method is adaptable in the present system is still unproven. In an effort to test the validity of the contentions that this is a superior method the Eureka High School of St. Louis County, Missouri, initiated an experiment in September, 1946.

The students of the sophomore class were divided into four sections, two of which were to be the experimental group, the other two to be the control group. One experimental class was scheduled to complete the entire second year of high school English in one semester; the other was expected to finish the course in world history during the same period of time. To make this more rapid progress possible, two class periods a day were devoted to the subject studied by the experimental groups. If a group were studying world history during the first semester, it met in that class twice a day, omitting its English class until the second semester, at which time this group changed its schedule and began to meet in English twice daily, omitting world history class. Those students who had been studying English twice a day during the first semester then began their world history class. In anticipation of the diminishing returns which might result from a period of two hours in length, the students of the experimental groups were scheduled to meet one period of sixty minutes in the morning and one of the same length in the afternoon with only one period having elapsed between the two sessions. During the intervening period the teachers of the English and the history classes were occupied with duties other than active teaching.

Of the one hundred thirty-eight students enrolled in world history and English in September one hundred six were considered in the evaluation of this experiment. The others were eliminated due to: their failure to complete the courses, their failure to take both English and history, or the lack of complete statistical records concerning them. Fifty-nine of the one hundred six students considered were in the experimental classes. The remaining forty-seven constituted the control group. This control group included a class of twenty-eight students whose reading ability, intelligence, and scholastic achievement were inferior. This, of course, decreased the reliability of the control group. However, the other group of the control students was one composed of students who were picked at random from the sophomore class. In making this report an attempt was made to overcome the disadvantage by basing the information from which conclusions were drawn upon a comparison between the actual achievement of each student and his intelligence. Although the fact is recognized that the usual ratio between these two factors is not high, in an ideal situation the two should coincide. Therefore, if this method of instruction results in closer correlation between intelligence and achievement, it is a desirable procedure.

The intelligence quotients used in this report were measured by the Terman McNemar intelligence test. The achievement used in the report was determined for the various scales either by the score on the final examination or the average of the two semester grades of each child.

The final examinations used for this purpose were teacher made tests. The world history test was composed of 221 items purporting to test knowledge of facts and chronology and understanding of relationships and of cause and effect. The English test consisted of 301 objective items covering the many phases of English grammar and the literature studied throughout the year.

In endeavoring to present the results of the experiment, various charts, tables, and graphs were formulated. Table I shows a comparison of the experimental and control groups in English as to intelligence and test scores. The intelligence ratings of 1, 2, 3, 4, and 5 were determined by ranking the students in the order of their intelligence and dividing them into groups corresponding to the number of E's, S's, M's, I's, and F's given on the final examination. The median I.Q. of the experimental group is higher, the range of I.Q. is the same for both groups, the standard deviation is smaller and the limits of the standard deviation are higher for the experimental group. Thus, the control group should not be expected to equal the experimental students in achievement. The statistics comparing the test ratings of the two groups shows greater difference between the median test scores than between the intelligence scores. The range is narrower for the experimental group, with the lower limit being one grade interval higher than the control group. The standard de-

TABLE I

COMPARISON OF THE INTELLIGENCE QUOTIENTS AND TEST GRADES OF THE ENGLISH GROUP

	Median Score	Range	Standard Deviation	Standard Deviation	
				Lower Limit	Upper Limit
Intelligence Ratings:					
Experimental group	3.63	1-5	1.02	2.61	4.65
Control group	3.24	1-5	1.08	2.16	4.32
Test Scores:					
Experimental group	3.79	2-5	1.01	2.78	4.80
Control group	3.14	1-5	1.05	2.09	4.19

TABLE II

PERCENTAGES FOR CHART A

Intelligence Ratings	Experimental Group			Control Group		
	% over-achievers	% normal achievers	% under-achievers	% over-achievers	% normal achievers	% under-achievers
5		56	44		50	50
4	33	56	. 11	14.3	14.3	71.4
3	32	52	16		63	37
2	75	25		42	25	33
1	100			29	71	

TABLE III

COMPARISONS OF THE INTELLIGENCE QUOTIENTS AND TEST SCORES OF THE WORLD HISTORY GROUPS

	Median Score	Range	Standard Deviation	Standard Deviation	
				Lower Limit	Upper Limit
Intelligence Quotients:					
Experimental group	109.35	65-138	13.4	96.0	122.8
Control group	101.9	67-124	15.1	86.8	117.0
Test Scores:					
Experimental group	146.25	95-204	26.4	119.9	172.7
Control group	127.5	80-184	26.05	100.5	153.6

TABLE IV

PERCENTAGES FOR CHART B

Intelligence Ratings	Experimental Group			Control Group		
	% over-achievers	% normal achievers	% under-achievers	% over-achievers	% normal achievers	% under-achievers
5		82	18			100
4	36.5	27	36.5	37.5	12.5	50
3	28.5	28.5	43	29		71
2	50	30	20	20	70	10
1	43	57		33	67	

CHART A: COMPARISON OF ABILITY AND ACHIEVEMENT OF ENGLISH STUDENTS

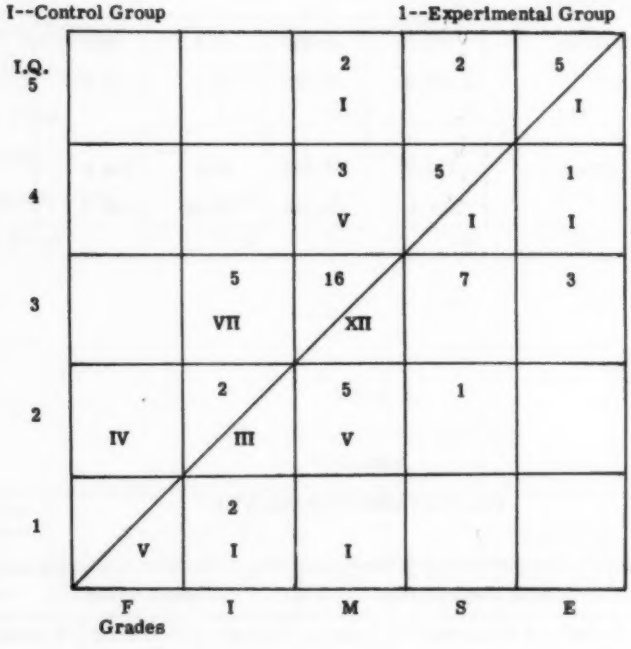
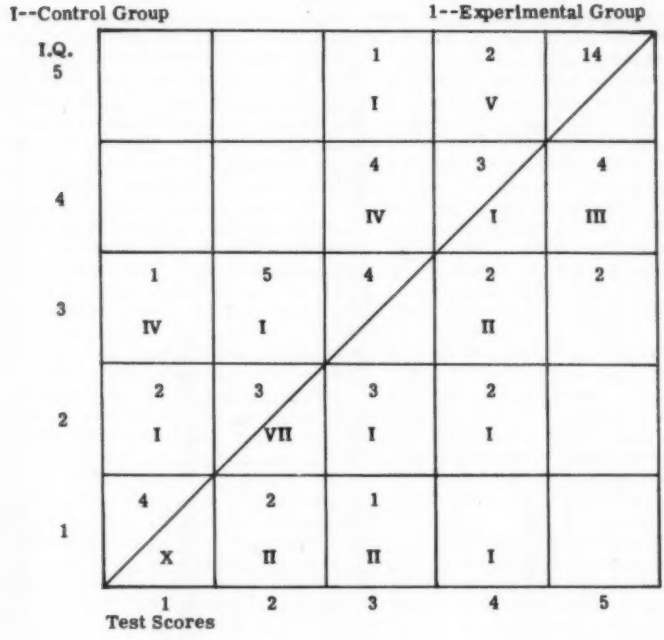


CHART B: COMPARISON OF ABILITY AND ACHIEVEMENT OF WORLD HISTORY STUDENTS



viation of the test scores of the experimental students is narrower with greater distance between the lower limits of the two groups and between the upper limit than is shown in a like comparison of the I.Q.'s of the two. This shows a greater difference in achievement than might have been expected, a difference favoring the experimental group.

Chart A illustrates the difference in achievement between the two groups as measured in English. The I.Q. divisions of 1, 2, 3, 4, and 5 were determined by the same method as the intelligence ratings for Table I. Thus, the eleven people with the highest intelligence ratings were expected to be the eleven who actually received the grade of E on the examination; the next sixteen people in rank of intelligence were expected to be those receiving the sixteen S's, etc. As is evidenced by this table, the experimental group contained a greater percentage of over-achievers and a smaller percentage of under-achievers on all levels than did the control group. For example, in the experimental group, nineteen of the fifty-nine were over-achievers and only twelve were under-achievers; whereas, only eight of the forty-seven people in the control group were over-achievers and seventeen were under par. This may indicate that the experimental students were challenged by the new method.

Table II compares the percentages of achievement in both groups. It points out that the control group has a lower percentage of over-achievers and a higher percentage of under-achievers than did the experimental group. It also indicates that the greatest over-achievers are found in the lower brackets of the experimental section and that the greatest under-achievers are in the upper brackets of the control section. This table also illustrates that on the upper levels the students in the experimental group worked up to their ability while in the same group those in the lower bracket achieved more than would have been predicted. The evidence thus given by this table should coincide with that given by Chart A.

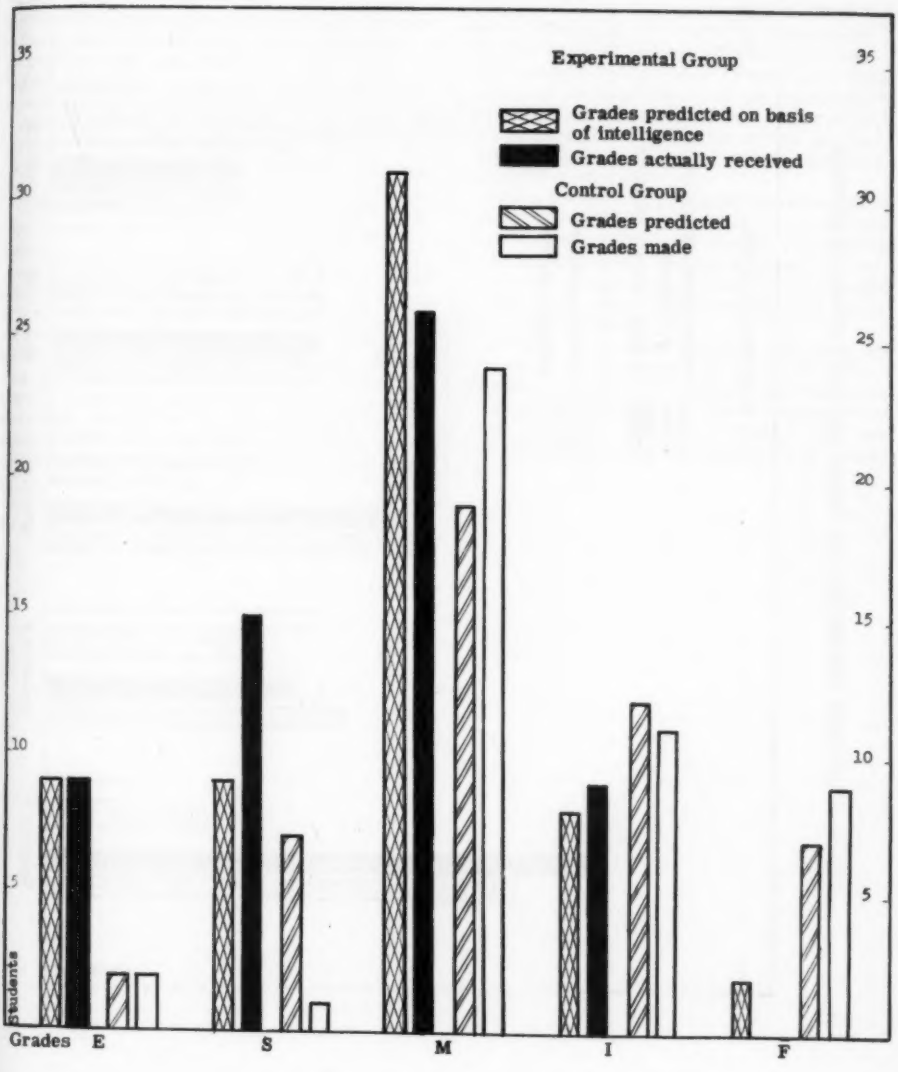
Graph 1 is based upon the distribution of grades as compared with the distribution of intelligence within each group. The ratings displayed here show that as a group the experimental students have done better on the S, M, I, and F levels than their intelligence ratings would have lead one to expect. The converse is obviously true in the control group.

All of this evidence might lead one to believe that in English the experiment was an improvement over the older method. It should be remembered, however, that the control group in English contained a class of twenty-eight retarded students who had little grammar instruction in their freshman year. Also, the experimental classes in English met at earlier periods in the day than did those in the control group. These factors may have some bearing upon the experimental group's higher achievement.

The world history test, as the statistics will indicate, shows slightly different results. Table III which compares the intelligence quotients and the tests scores of the experimental group with those of the control group shows that as measured by the hisory test, the median score, the range, and scores of the central section of students of the experimental group are higher than in the control group. The median score for the experimental group is about nineteen points higher than the median score for the control group. The lowest score for the experimental group is fifteen points higher and the highest score twenty points higher than the highest score of the other group. The table shows the standard deviation slightly broader for the experimental group with the lower limit and upper limit for this deviation each approximately nineteen points above the respective scores for the control students. A similar study of the statistics concerning the intelligence of the two groups shows more similarity than test results. The experimental group's median score is about seven points higher than that of the other group, with their lower range being two points lower and the top range twelve points higher than those of the control group. The standard deviation of the experimental group covers a narrower range with its lower limits about nine and its upper almost six points higher than the respective data show for the control group. This shows that the experimental group should and did make a higher achievement record. Chart B is comparable to Chart A. The divisions on Chart B, however, are based upon the quintile distribution of the students' intelligence ratings and of their final examination test scores. The chart shows that twenty-seven percent are over-achievers in the experimental group and that twenty-five and one-half percent are over-achievers in the control group. It also shows that twenty-five and one-half percent of the experimental students are under-achievers, whereas thirty-four percent of the control students are under-achievers. This shows that slightly more of the experimental students are working up to and above their ability than are those of the control group.

Table IV gives a more detailed comparison of the percentage of over-achievers and under-achievers of the two groups. It gives the comparison for each quintile divisions of the intelligence ratings of the experimental group and the control group. A comparison of the quintile one and two shows that there are a higher percentage of over-achievers in the experimental group. On the level of quintile three and four the percentages are almost the same with a very slight advantage for the control group. The comparison of the under-achievers shows a larger percentage among the control group on every level except the second quintile. Thus, on every level except the second quintile there is a larger percentage of students working up to or beyond their ability in the experimental group.

GRAPH 1: GRADES PREDICTED AND THOSE RECEIVED IN ENGLISH



GRAPH 2: RATINGS PREDICTED AND THOSE RECEIVED IN WORLD HISTORY

Graph 2 would further substantiate this conclusion by showing that a larger number of the upper quintile groups have received higher test scores than would have been predicted on the basis of intelligence.

In the light of this information it seems that the students in the experimental history group have tended to gain more information than those in the history control group, although they did not show as much superiority as those in the English experimental group. The fact must not be overlooked that one-half of the control group in history was taught by a different teacher than the one who taught the experimental group. It is impossible to measure what effect this may have had on the experiment.

The statistical evidence slightly favors the experimental group in both English and world history.

As is true in initiating anything new or different several difficulties were encountered. Some of these would disappear with permanent adoption of the plan. Any time lost due to holidays or pupil absences was twice as detrimental to the experimental group as to the control group, for one day's absence meant that two class periods were lost. Insofar as the teachers were concerned, more work was involved. Instead of planning and teaching three classes which were running concurrently, they had to plan for and teach three classes each of which was at a different point of advancement at all times. From the viewpoint of the school's administrators the experiment caused a minor problem in that it made the curriculum less flexible, thereby denying a few students the opportunity of taking desired courses. It also made the entire class schedule somewhat more difficult to arrange than it previously had been. There was a small number of students who were inconvenienced by this arrangement because it was impossible for them to change their schedule during the year without loss of credit. Transfer students met this same difficulty.

The teachers who conducted the experiment found it enjoyable for a number of reasons,paramount among which were that the experimental students displayed a livelier interest than did the control group, and the continuity of thought seemed to be greater in the experiment due to the concentrated study.

Although the experiment may have been just a novelty, the exuberance for which possibly soon wore off, and the sampling may have been too small and unreliable to give conclusive evidence, the experiment, nevertheless, may have been advantageous for the students who participated.